ORDER NO. VRD-8106-876

Service Manual

Color Video Camera
PK-801

V 715

Vol. 1	Vol. 2	Vol. 3	Vol. 4	Vol. 5
Summary ***Technical Descriptions***	***Troubleshooting Guide*** ***Adjustment Procedures***	***Block Diagrams***	***Schematic Diagrams***	***Exploded Views*** ***Replacement Parts List***

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Vol. 1

Summary Technical Descriptions

SPECIFICATIONS:

Power Source:	DC 12V ± 10% AC 120V ± 10%, 60Hz ± 0.5% (with Power Supply Unit)
Power Consumption: (with E.V.F)	DC 7.5W at 12V DC (Battery) DC 0.7W at Standby
Special Tube System:	2/3″ frequency separation single tube system (built-in stripe filter)
Signal Carrier Frequency:	3.58MHz
Focus System:	Electro-static type
Lens Mounting:	Built-in zoom lens (not "C" mount)
Lens:	6:1 zoom lens with auto/manual iris control. Auto zoom lens and macro construction F: 1.4, f: 12mm—72mm, d: 1.3m—infinity
Light Sensitivity:	Minimum light intensity on optical image: 50 Lux (F: 1.4) Optimum light intensity on optical image: 900 Lux
Video Output Level:	1.0Vp-p, 75Ω (M type coaxial connector) (Standard NTSC signal)
Sync. System:	Internal Sync: RS-170
Signal to Noise Ratio:	More than 43dB
Horizontal Resolution:	More than 240 lines
Color Temperature Control:	2 step switch (indoor, outdoor) & auto adjust

Microphone:	Condenser Microphone
Audio Output Level:	−20dB, Hi-impedance
Audio Output Impedance:	High impedance (1KΩ)
External Microphone Input Impedance:	600Ω unbalanced
Electronic Viewfinder:	Monochrome 1.5 inch CRT
Operating Temperature:	5°C to 35°C
Operating Humidity:	10% to 75%
Operating Position:	Normal position only
Weight:	Camera Head with E.V.F. 6.3 lbs (with lens, 7ft. cable & shoulder pad/handle grip) AC adaptor (option) 2.4 lbs
Demensions:	Camera Head with E.V.F 7″(W) × 8″(H) × 13″(D) 177mm(W) × 210mm(H) × 318mm(D) AC adaptor (option) 3″(W) × 3″(H) × 6″(D) 80mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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GENERAL INFORMATION AND FEATURES

This small, easy-to-carry Panasonic portable color video camera feature a new 2/3 inch integral stripe filter special pick-up tube and is fully self-contained. With this pick-up tube, the camera produces a high quality video signal with the lowest possible noise. The special photo conductive layer of the image tube is also burn resistant so that most bright scenes do not leave an after-image. This camera can receive its power from a Panasonic portable video cassette recorder or power supply/camera AC adaptor.

The PK-801 is a high quality camera with an ALC (Automatic Light/Iris Control) zoom lens that produces 240 lines horizontal resolution*(B & W image) with the recommended illumination of 90 footcandles (900 lux). Minimum illumination is only 5 footcandles (50 lux) at F1.4.

The 1-3/8" (actual visual size measured diagonally) CRT viewfinder, can also be used for VCR playback. Synchronous audio and video recording are controlled by a single silent trigger located on the camera handgrip.

***B & W Image:**

Black and white or luminance (the technical term) is used for the purpose of measuring the amount of detail that this camera will produce when using a resolution chart and Video Monitor.

Features

Electronic viewfinder

The electronic viewfinder allows you to see exactly what the camera lens sees. Inside the viewfinder there is one LED indicating insufficient light intensity, one LED for indicating VCR remote control status and one LED for white balance control status.

Zoom lens with Power zoom and MACRO function.

6:1 zoom lens with Power zoom allows you to "zoom-in" for a closer picture. This is simply done by pressing the Power zoom switch. Also, close-up pictures can be achieved by using MACRO function.

Automatic iris control

Automatic iris control adjusts the amount of light entering the camera to provide the proper picture contrast.

Automatic white balance control

Optimum color pictures can be achieved under varying lighting conditions.

Boom microphone

Sound as well as pictures can be recorded at the same time because the camera contains a built-in microphone that can also be extended to distinctly pick up sounds.

Standby switch

The standby switch is for saving battery power when the recording is in the pause mode for a long period.

AGC ON/OFF Switch

Camera gain can be increased for use in low light conditions.

Fader switch

The picture automatically fades in or fades out every time you push the VCR remote control switch.

Optional Remote Control

The optional remote controller allows remote operation of CUE and REVIEW of a PV–4000 series portable recorder.

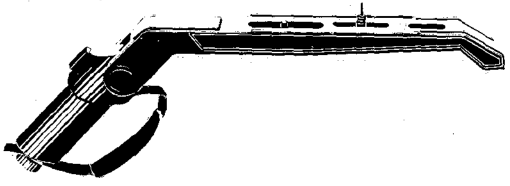
ACCESSORIES

Accessories included:

Standard accessories (supplied)

Camera Unit (PK–801) . . 1 pc

Electronic Viewfinder (PK–MO51) . . 1 pc

Shoulder pad with handle grip (VYHW0035) 	**Optional accessories** *10-pin extension camera cable (approx. 6m, 20 ft) (20H–20R) *Holder Pod (PK-T001S) *AC Adapter (PK–A789) with 3 cables *Tripod/monopod (PK–T008) *Remote controller for PV–4000 series

PRECAUTIONS

The PK-801 is a sensitive, high quality instrument and should be regarded as such. Because it is an electrical device, the danger of electric shock exists if it is used carelessly.

DON'TS

×Do not attempt to disassemble the camera or power supply. In order to prevent electric shock, do not remove screws or covers. There are no user-serviceable parts inside.

×Do not abuse the camera. Avoid striking, shaking etc. The camera contains a sensitive pick-up tube which could be damaged by improper handling or storage.

×Do not let the lens remain uncapped when the camera is not in use.

×Do not touch the surface of the lens with your hand.

×Do not use strong or abrasive detergents when cleaning the camera body.

×Do not aim the camera toward the sun or other extremely bright objects, whether it is turned on or not. This action could permanently damage the pick-up tube.

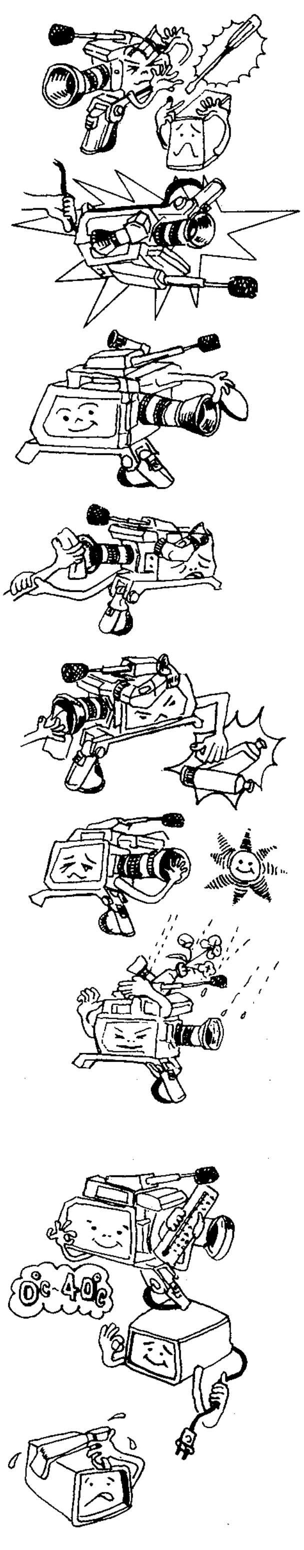
×Do not expose the camera or power supply to rain or moisture, or try to operate it in wet areas. Do not operate the camera or power supply if it becomes wet.

×Do not use the camera in an extreme environment where high temperature or high humidity exist.

×Do not try to operate the camera and power supply on power line voltages other than 120V AC±10% at 60 Hz.

×Do not leave the camera and power supply turned on when not in use.
Do not turn the power on and off repeatedly without use. Do not block the ventilation slots.

×Do not store the camera under conditions where temperatures are over 122°F (50°C).



DO'S

●Do refer any servicing to qualified service personnel.

●Do handle the camera with care.

●Do protect the precision lens by placing the lens cap over the lens when the camera is not in use.

●Do use a mild blower or lens cleaning paper designed for coated lenses to clean the surface of the lens or pick-up tube in the event that they become dirty.

●Do use a dry cloth to clean the camera when dirty. In case the dirt is hard to remove, use mild detergent and wipe gently.

●Do use caution when operating the camera in the vicinity of spot lights or other bright lights, and light reflecting objects.

●Do take immediate action if ever the camera or power supply do become wet. Turn power off and dry them thoroughly before using again. Moisture can damage the camera and power supply and also create the danger of electric shock.

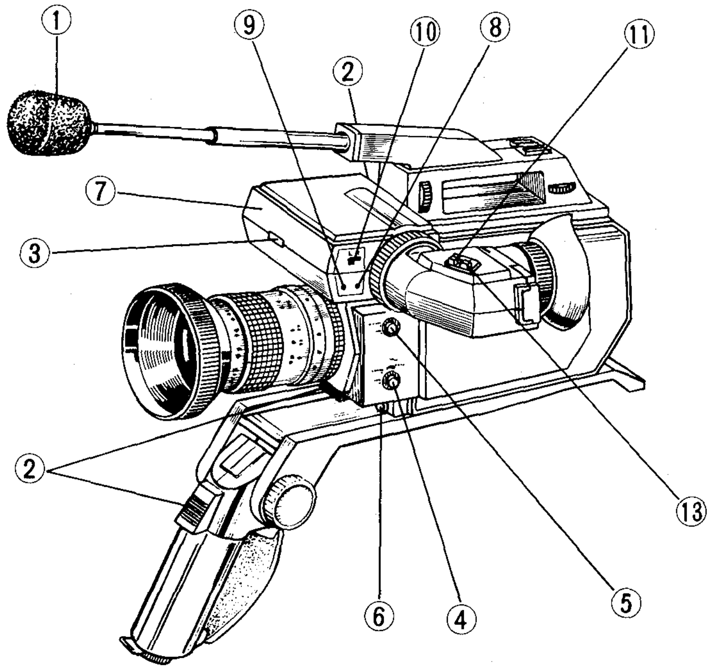
●Use the camera under conditions where temperatures are within 32°F ~ 104°F (0°C ~ 40°C), and humidity is below 75%.

●Use the camera and power supply only with the proper line voltage.

●Always turn the power off when the camera is not going to be used, this will extend the life of the pick-up tube. Operate the camera and power supply only where there is adequate ventilation.

OPERATING COMPONENTS AND THEIR FUNCTIONS

A. Camera Head



① **Boom Microphone**

To record audio while the picture is recorded. Extend out the boom microphone to distinctly pick up sounds when recording.

② **VCR Pause Switches (pause trigger)**

The trigger operated switch is used to place the VCR in the pause mode while focusing or adjusting the camera. These switches are located on the camera head, on the handle grip and on the Electronic Viewfinder.

③ **Tally Light (VCR remote control status LED)**

The tally light (red) flashes while recording so that person before the camera can recognize that recording is actually in progress.

④ **Auto/Manual Iris Control Switch**

This switch selects the lens iris control for MANUAL or AUTO.

(1) When setting to the "AUTO" position, the auto-iris automatically adjusts the lens opening or aperture to admit the proper amount of light for the camera.

(2) When setting to the "MANUAL" position, the lens iris can be manually adjusted.

⑤ **Color Temperature Correction Switch (Filter selection)**

Optimum color pictures can be achieved for varying light conditions.

This switch selects the approximate corrections for indoor or outdoor.

Set to "OUTDOOR" for outdoor use and set to "INDOOR" for indoor use.

⑥ **Automatic White Balance Control (A.W.C.) Switch**

The camera has an Automatic White Balance Control circuit. White balance is automatically set by pushing the A.W.C. switch, after making the proper selection of color temperature correction switch. Also the A.W.C. indicator on the EVF glows green when the white balance is automatically set.

It is recommended that the A.W.C. switch is repushed to adjust the white balance whenever the scene is changed.

⑦ Electronic Viewfinder

This is a small TV monitor which shows the actual picture that the lens sees.

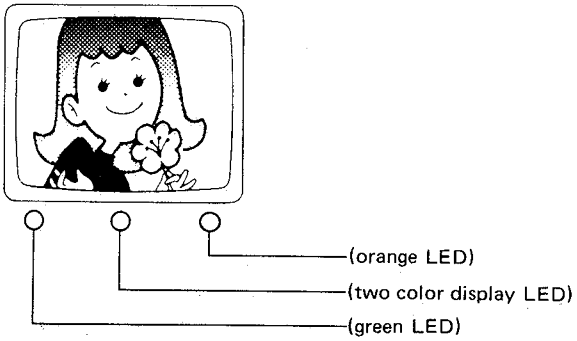
This Electronic Viewfinder is attachable to either side of the camera head considering right or left hand operation.

a) Light intensity indicator

This indicator consists of one LED that, when illuminated, indicates insufficient light for producing a quality picture. The camera has an Automatic Iris Control Circuit. It makes sure that the iris is opened for proper exposure and under sufficient light conditions, turning off the orange light. Therefore, when the orange light is on, the light intensity is insufficient. Adjust the brightness and contrast of the Electronic Viewfinder picture only when the orange light is off. These controls are located on the side of the viewfinder. Use a small screw driver to adjust these controls.

Note: It is not necessary to adjust these controls under normal circumstances. But, should it become necessary it is recommended that you use a plastic screw driver and make the adjustment with caution so as not to damage the miniature controls.

Viewfinder Picture Tube



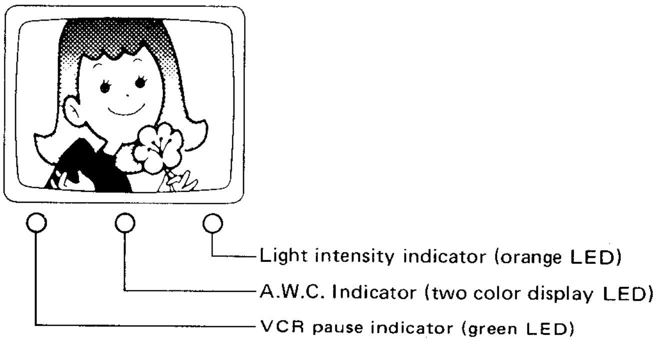
When the orange LED lights, illumination is too low.
Provide more illumination.

b) A.W.C. Indicator (Automatic White Balance Control)

This indicator is a two-color LED which is used with the Automatic White Balance Control. The LED glows RED when the camera is turned on. This means that the white balance hasn't been set yet. Before you are ready to shoot — press the A.W.C. button. While the white balance is automatically adjusted — the LED flashes RED — GREEN — RED — GREEN, etc. The LED will glow GREEN when the white balance is set. Set A.W.C. again if the lighting is changed.

c) VCR pause indicator

This green indicator is on when the recording is in progress.


Light intensity indicator (orange LED)
A.W.C. Indicator (two color display LED)
VCR pause indicator (green LED)

⑧ Brightness Control

This control adjusts for brightness of the electronic viewfinder picture. Adjust gently with a small screw driver.

⑨ Contrast Control

This control adjusts for contrast of the electronic viewfinder picture. Adjust gently with a small screw driver.

⑩ Picture turning switch

This switch is used to invert the picture on the EVF and should be switched only with power off.

(1) Set to the "R" position for right hand operation.
(2) When the EVF is mounted for left hand operation, the viewfinder picture is upset down. Accordingly set to the "L" position so that the picture on the EVF can be seen in normal condition. This switch does not affect the picture which is recorded.

⑪ Power Zoom Speed Selection Switch

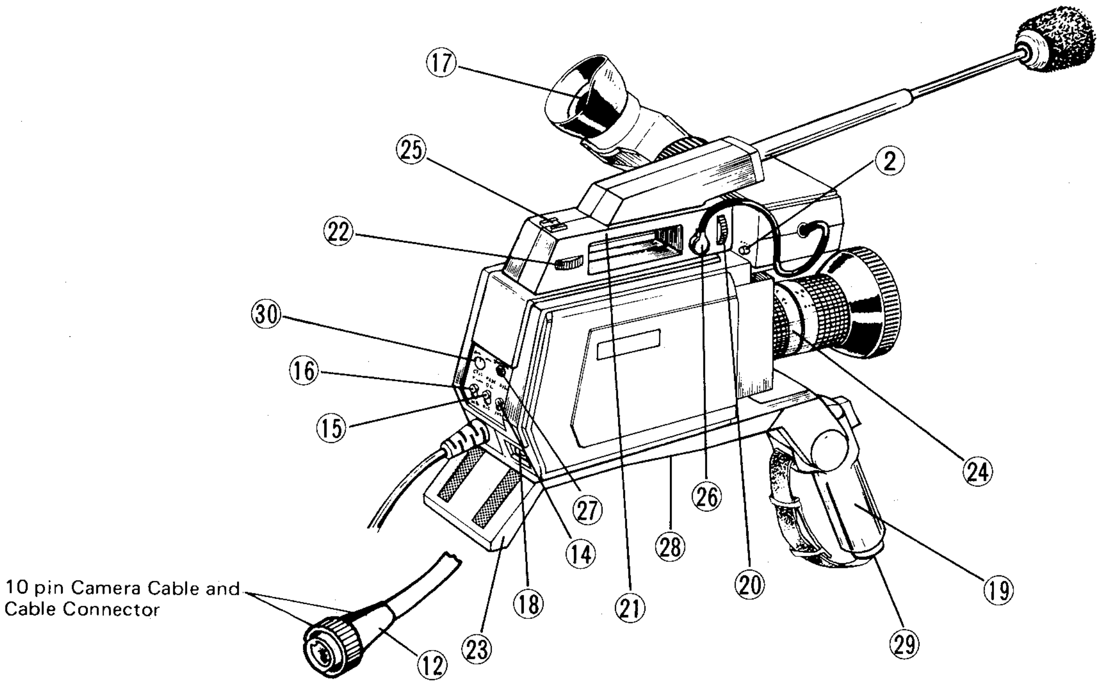
This camera has a power zoom lens with two step speed.

Select the desired zooming speed.

FAST: approx. 6 seconds from zoom-in/out to zoom-out/in.
SLOW: approx. 10 seconds from zoom-in/out to zoom-out/in.

⑫ Camera Cable

This 7 foot long cable is used to provide the interconnections between the camera and portable VCR.



⑬ Power Zoom Switch

This switch works in conjunction with the zoom lens, and allows you to "Zoom-in" (Telephoto or T position) or "Zoom-out" (Wide Angle or W position) by pressing it.

⑭ Standby Switch

This switch is used for longer battery operation. Set this switch to "Standby" when leaving the camera in the pause mode for a long period.

The picture disappears on the Electronic viewfinder when setting this switch to "Standby". When the standby switch is set to "Operate", the camera and portable VCR operate normally.

⑮ Fader Switch

This fade-in/out functions in conjunction with the VCR remote control switch on the camera head. When setting this switch to the "ON" position, the picture automatically fades in or fades out every time you push the VCR remote control switch. Fade-in time is approx. 8 seconds and fade-out time is approx. 5 seconds.

⑯ AGC ON/OFF Switch

This switch changes the camera's automatic gain control (AGC) for use in low light situations. Set this switch "ON" when the orange LED indicating insufficient light intensity stays on. In normal circumstances keep the switch "OFF".

⑰ Viewfinder Picture Tube

The 1.5" picture tube will show the actual scene the camera "sees".

⑱ External Microphone Input

Accommodates an external microphone to permit closer audio pick-up. The built-in boom microphone is automatically disconnected when the external microphone is plugged in. Use a microphone with 600 ohm impedance.

⑲ Adjustable Handle Grip & Knob

This grip is used for holding the camera and is tiltable for easy holding and operation. The grip should be firmly tightened by turning the knob.

⑳ EVF Mounting Roller

This roller tightens the EVF to the camera head firmly.

㉑ Adjustable Carrying Handle

This handle is useful when hand carrying the camera and is adjustable to afford the most comfortable position. Loosen the Handle Fixing Roller and simply slide in or out for your comfort.

㉒ Carrying Handle Fixing Roller

This roller tightens the carrying handle to the camera head.

㉓ Shoulder pad

This shoulder pad is useful when recording without a tripod and is adjustable for comfortable position.

㉔ Macro Position

For close up pictures down to a distance of 2 in. Pull the zoom lever to set the zoom ring to the Macro position.

Note: Make sure the illumination on the subject is sufficient for close up shooting.

㉕ **Accessory Shoe**

This shoe is for attaching the optional camera remote control unit to the camera head.

㉖ **Electronic Viewfinder Connector**

This is a receptacle for the connection of the electronic viewfinder.

㉗ **Camera Remote Control Connector**

This is a receptacle for the connection of the camera remote control unit. Remove the cap when using this connector.

㉘ **Tripod Mounting Hole**

This hole is used for mounting the camera on a tripod with standard 1/4-20 thread.

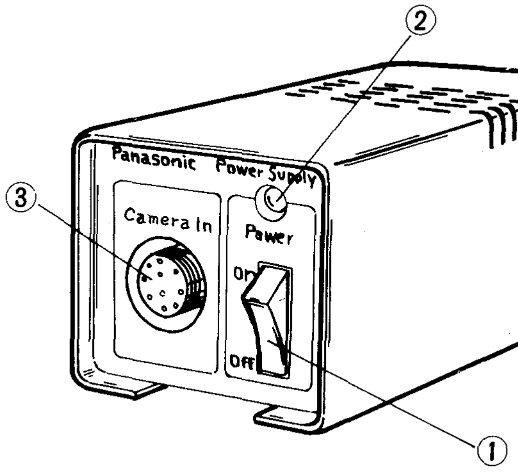
㉙ **Holder Pod Mounting Hole**

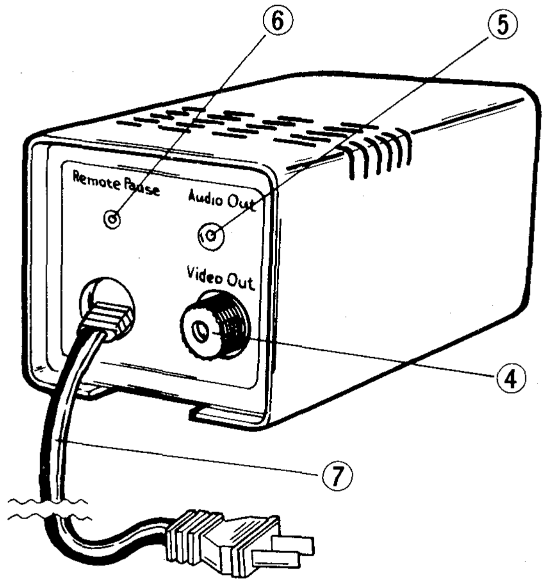
This hole is used for a holder pod.
This hole should not be used to mount the camera on a tripod.

㉚ **Color Control Knob**

The red and blue color are balanced and preset at the center (detent) position which usually will provide accurate color reproduction. When used indoors, the color balance control can be adjusted while viewing a TV.

B. POWER SUPPLY (optional)





① On/Off Switch

This switch turns the color camera system power on and off.

② Power Indicator Light

This lamp lights when power is on.

③ Camera Input Connector (Camera In)

Connect the camera 10 pin cable connector here. Be sure the cable connector is fitted securely to the input connector.

④ Video Output Connector (Video Out)

The video output connector supplies NTSC color signal to the VCR. Connect the silver end of the video cable here. The white end should be connected to the video input connector on back of the video cassette recorder.

⑤ Audio Output Connector (Audio Out)

This connector supplies an audio signal from microphone to the VCR. Connect one end of the audio cable to the power supply, the other end to the audio in connector on back of the recorder. This cable can be identified by its red end.

⑥ Remote Pause Connector (Remote Pause)

This connector connects to the VCR with the remote control cable, in order to pause the VCR from the camera head.
Connect one end of the remote pause cable to this connector, the other end of the cable to the remote pause connector on back of the video cassette recorder. This cable can be identified by its black end.

⑦ Power Cord Plug

Connect the two prong polarized plug to a wall socket (120VAC). If the socket works for an ordinary table lamp, for instance, it is right for your unit.

NOTE:

This Power Supply must be used when connections are made to a Video Tape Recorder (VCR) that does not have a 10 pin connector.

These cables are included with the power supply.

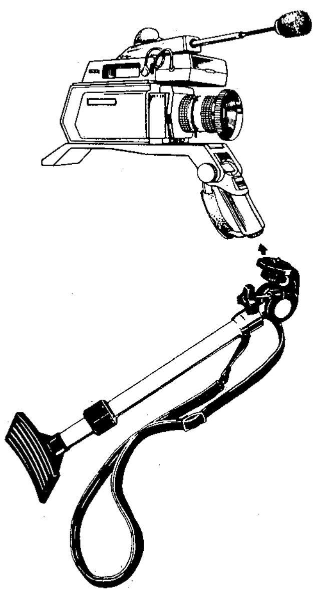
Audio cable (Red connectors) (VJAK0118)
Remote pause cable (Black connectors) (VJAK0115)
Video cable (One end has a white connector, the other has a silver connector) (VECK126)

MOUNTING THE CAMERA ON THE TRIPOD OR HOLDER POD

The camera may be attached to a tripod when you wish to make recordings while not holding the camera or if you need to keep the camera very steady while recording.

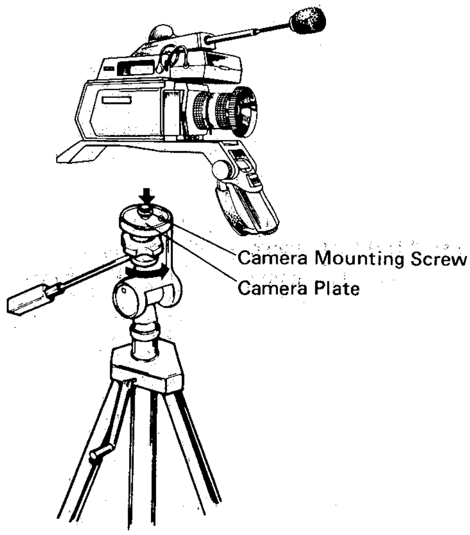
1. TO USE THE HOLDER POD (PK–T001S)

Attach the camera mounting screw of the holder pod to the mounting hole located on the bottom of the handle.



2. MOUNTING THE CAMERA ON A TRIPOD

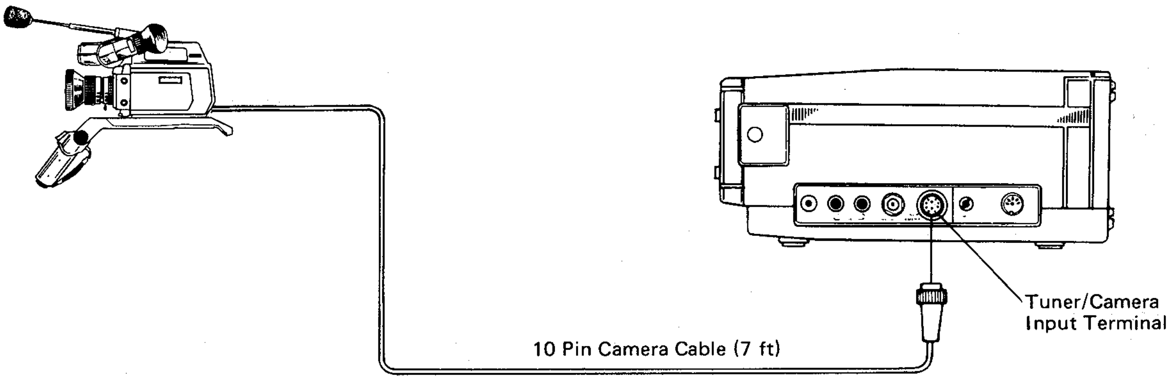
Mount the camera with shoulder pad onto the tripod by screwing the mounting screw on the tripod (standard 1/4"-20 thread) into the mounting hole on the shoulder pad. You may mount the camera onto the tripod without shoulder pad.



Be sure that the camera is securely fastened.
Be sure that the tripod is sturdy enough to hold the camera.

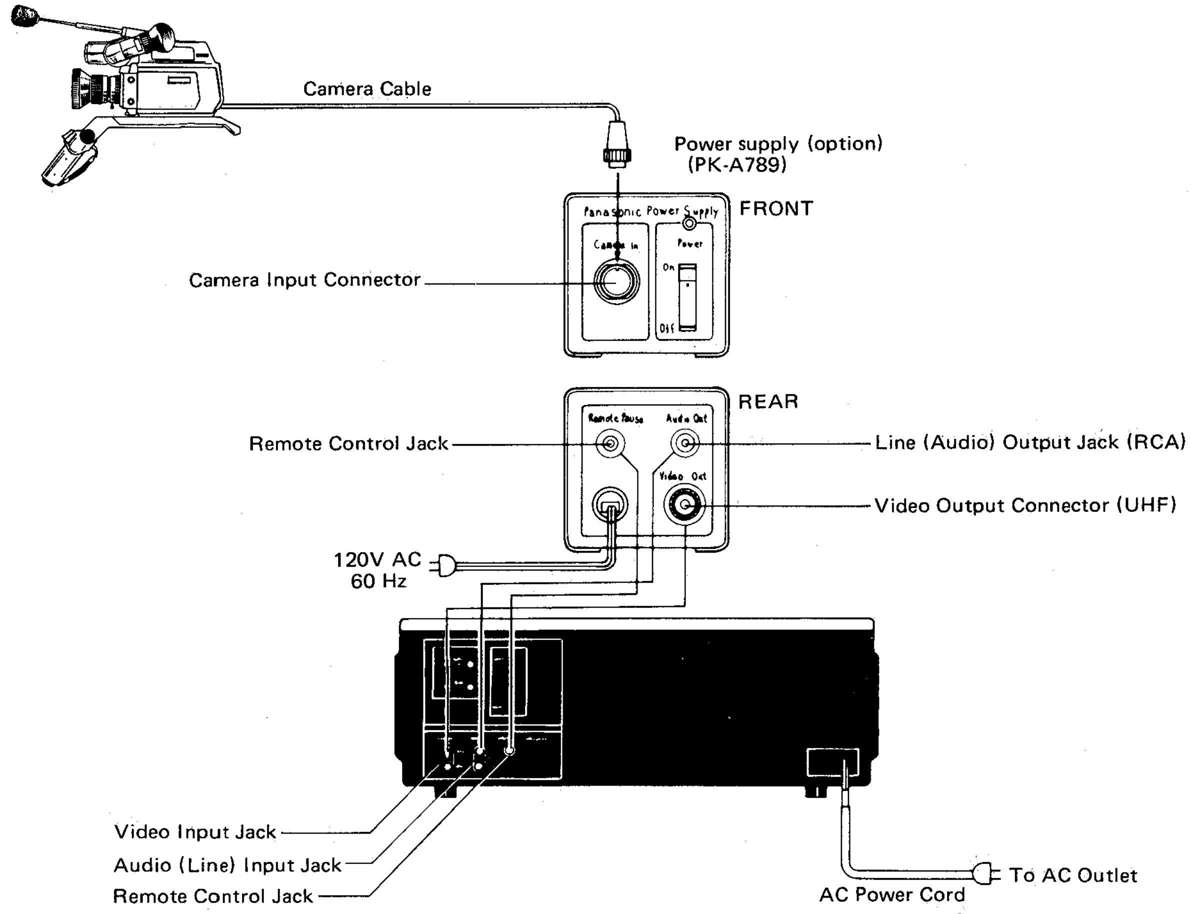
CONNECTION DIAGRAM

A: Camera Head and portable VCR


Tuner/Camera
Input Terminal
10 Pin Camera Cable (7 ft)

Connect the camera cable to 10-pin socket on portable VCR as illustrated. Be sure to connect the camera to the portable VCR before turning on the power switch on the portable VCR. If the switch is turned on prior to connecting the cable, trouble could develop.

B: Camera Head, optional power supply and VCR without 10-pin connector


Camera Cable
Power supply (option)
(PK-A789)
FRONT
Panasonic Power Supply
Camera In
Power
On
Off
Camera Input Connector
REAR
Remote Pause
Audio Out
Video Out
Remote Control Jack
Line (Audio) Output Jack (RCA)
Video Output Connector (UHF)
120V AC
60 Hz
Video Input Jack
Audio (Line) Input Jack
Remote Control Jack
To AC Outlet
AC Power Cord

1. Connect the camera cable from the camera head to the 10-pin camera socket on the power supply, (PK–A789). (Make sure that the power switch of the power supply is turned off before connecting the cable.)
2. Connect the video cable from the VIDEO OUT socket (UHF connector) on the power supply to the VIDEO IN connector (RCA phono connector) on the VCR.
3. Connect the audio cable from the AUDIO OUT connector on the power supply to the AUDIO IN connector on the VCR.
4. Connect the VCR remote control cable from the REMOTE connector on the power supply to the REMOTE PAUSE connector on the VCR.
5. Plug in the power plug of the power supply into wall socket (120 Volts ± 10%)
6. Insert the AC power plug of the VCR into the wall socket.

Notes:

1. The camera cable between camera head and power supply or between camera head and portable VCR can be extended by using the optional extension camera cables.
   (Use three 20 feet extension cables to extend upto 67 feet)
2. The connections between the VCR and TV set are explained in the operating instructions for the VCR.

C: Camera Head and Electronic Viewfinder

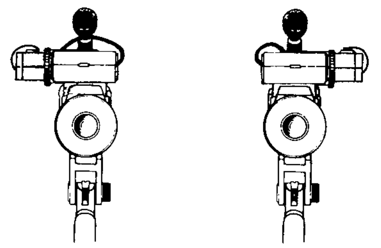
The Electronic Viewfinder is attachable to either side of the camera head for easy operation.
The following is the installation procedure for right hand/eye operation.

1. Attach the Electronic viewfinder to the camera head and tighten the EVF Mounting roller firmly.
2. Plug the connecting cable on the Electronic Viewfinder into the connector on the camera head.
3. Set the picture turning switch to the "R" position.

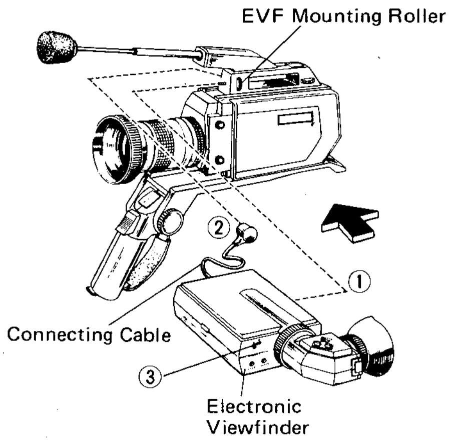
Note:

The above procedure is for mounting the Electronic Viewfinder for right hand and right eye use.
When mounting the Electronic Viewfinder for left hand and left eye use, unscrew the EVF Mounting roller, flip the viewfinder over and reattach by following the same procedure.

Also, rotate the eye cap on the Electronic Viewfinder so that it may fit to your own eye.
The picture turning switch should be switched only with power off. If the picture in the viewfinder is upside down, you have the turning switch in the wrong position.
Turn power off, and move the turning switch to the correct position.

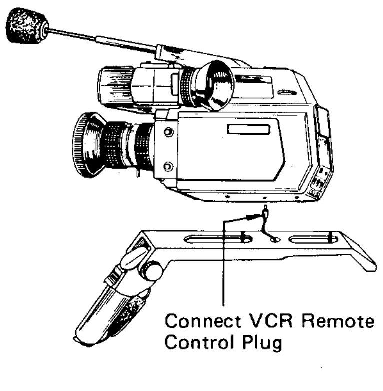

Left Hand Operation　Right Hand Operation

Front View of Camera



D: Camera Head and Shoulder Pad

1. Plug in the VCR remote control connector into the connector on the bottom of the camera head.
2. Attach the Shoulder Pad onto the bottom of the camera head and tighten the screws on the Shoulder Pad at a comfortable position.

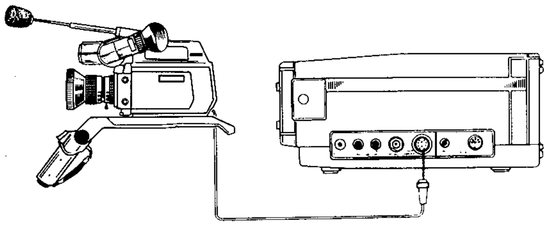


OPERATING PROCEDURE

Caution:

Never direct the camera at the sun or other strong light source even when the camera power is turned off. Also do not direct it at objects that reflect intense light (glass, metal, etc.).

If strong light enters the camera, it could burn the expensive pick-up tube, rendering it useless.

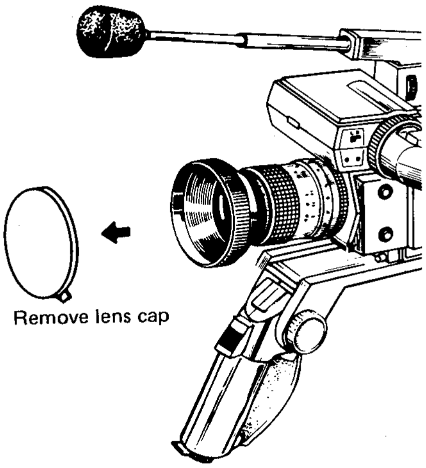


1. Connect the camera and portable VCR as previously shown.

2. Remove the lens cap.

3. Turn the power switch of the VCR on, and press the Rec and Play buttons simultaneously.

   - On some VCR models you may have to switch the input selector to the camera position.



4. Confirm that the VCR remote indicator (green LED) on the Electronic Viewfinder is turned off. If the green LED is on, depress the VCR pause switch on the camera. (If the green LED lights, actual recording is being made.)

5. Select the Color Temperature Correction switch for indoor or outdoor use.

   Note: For additional information regarding lighting, turn to page 18.

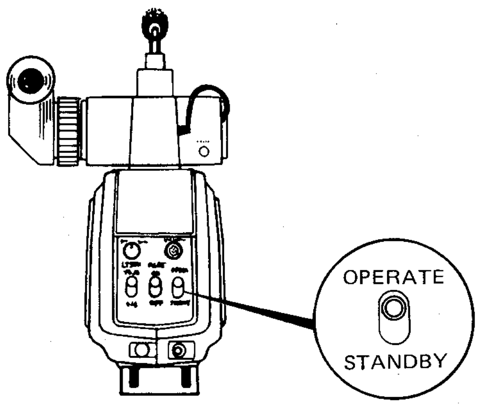
6. Set the Standby switch to the "Operate" position.

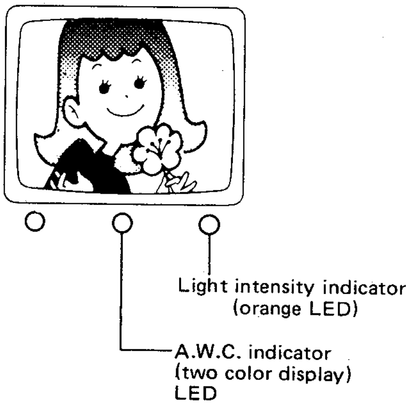
   Note: To save power while preparing to record, it is better to use the STAND BY SWITCH in order to only preheat the pick-up tube of the camera to save battery power.

7. Confirm that the orange LED indicator is not illuminated. This indicates that light intensity to the camera lens is proper.

   Orange LED on . . . . . . need more incoming light.

8. Press the Power Zoom Switch ("T" side) for maximum close-up. Adjust lens focus for the sharpest picture. Focus will now track over the entire zoom range.



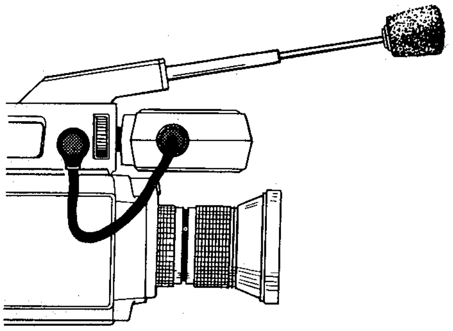


9. Aim the camera at a white object (never at a light source). White lens cap may be placed on the lens if there is no white object.
   Push the A.W.C. switch to adjust the white balance.
   And wait for the A.W.C. indicator on the EVF to glow green.
   Note: It is recommended that the A.W.C. switch is repushed to adjust the white balance every time a new scene is selected.

10. Depress the VCR pause switch on the camera. The remote pause indicator light will light as the recorder begins to record.

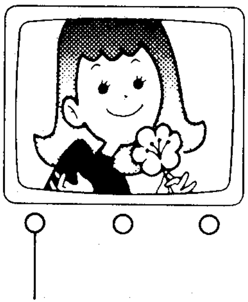
11. Depress the VCR pause switch on the camera to pause the recorder anytime. Depress the switch again to resume recording.

12. Instant Replay.
    To watch the program just recorded, rewind the tape, then press the Play button. The playback picture appears automatically on the viewfinder of the camera when connected to the portable VCR. When the power supply is used this feature does not function.



13. STANDBY Setting
    Employ the STANDBY switch to avoid unnecessary power consumption when you expect to pause the recording more than a couple of minutes.
    1. Pause the recording by pressing the VCR pause switch on the camera.
    2. Set the standby switch to the "STANDBY" position during the pause mode.
    3. Set the standby switch to the "Operate" position just before the recording is resumed. Wait for the viewfinder picture to appear.
    4. Resume the recording by repressing the VCR pause switch on the camera.

    Please note that video noise during playback may appear on the monitor if you do not follow this procedure. Operations can't be performed when the camera is set to the "STANDBY" position when operating with a portable VCR.



14. AGC
    The camera sensitivity can be increased for use in low light conditions.
    In adequate lighting conditions, it is preferable not to use this boost.

Note:
1. Focus should be adjusted all the way at the zoomed-in (telephoto) position. Focus should then track over the entire zoom range. When the camera is aimed at a new scene or object, refocusing will be required.
2. Always replace the lens cap when the camera is not in use.

DESCRIPTION OF FUNCTIONS

•Macro

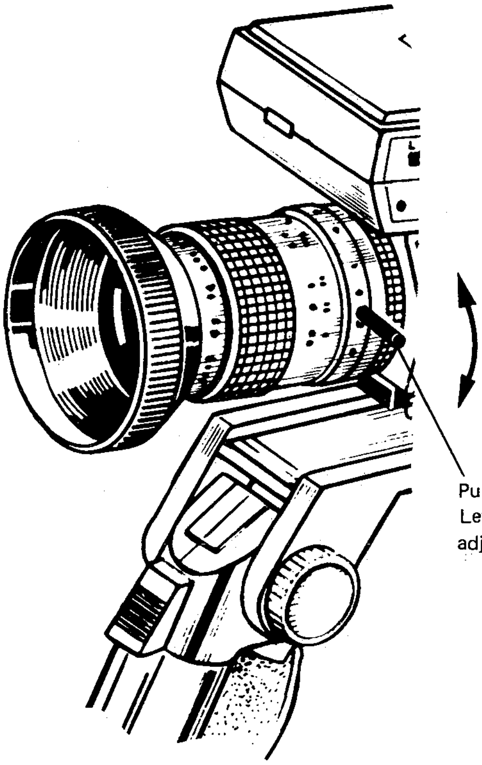
The PK–801 lens, with Macro capability, allows the user to reduce the minimum focal point of the lens and therefore permits good focusing on subjects at a very short distance from the lens.

Macro function is really a special effect and should not be used for normal camera shots. The definition for Normal and Macro are as follows:

NORMAL	MACRO
Subject to Lens distance is Greater than 1 meter	Subject to Lens distance is Less than 1 meter

TO USE MACRO:

1. Press the Power Zoom Switch to obtain the widest position.
2. Pull the Zoom Lever out; then turn Zoom Ring for best Macro focus.
3. Subject to lens distance should be 1 meter or less. You will notice that a slight change in subject to lens distance will change the Macro focus considerably.
4. To return to normal – place the Zoom Ring back to its normal position and allow the Zoom Lever to reseat.



Pull Zoom
Lever out, then
adjust macro focus

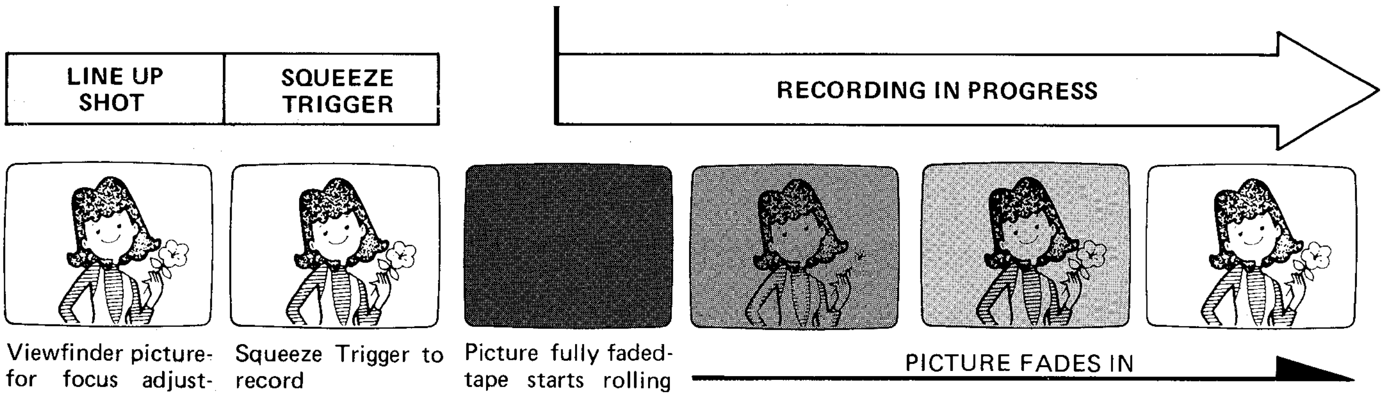
• Fade IN/Fade OUT

Professional looking tapes can be made by using the Fader Switch.

When the Fader Switch is ON:

1. The picture will "fade in" everytime the camera trigger is squeezed to start recording.
2. The picture will "fade out" everytime the camera trigger is squeezed to pause the recorder.

FADE IN


LINE UP SHOT
SQUEEZE TRIGGER
RECORDING IN PROGRESS
PICTURE FADES IN

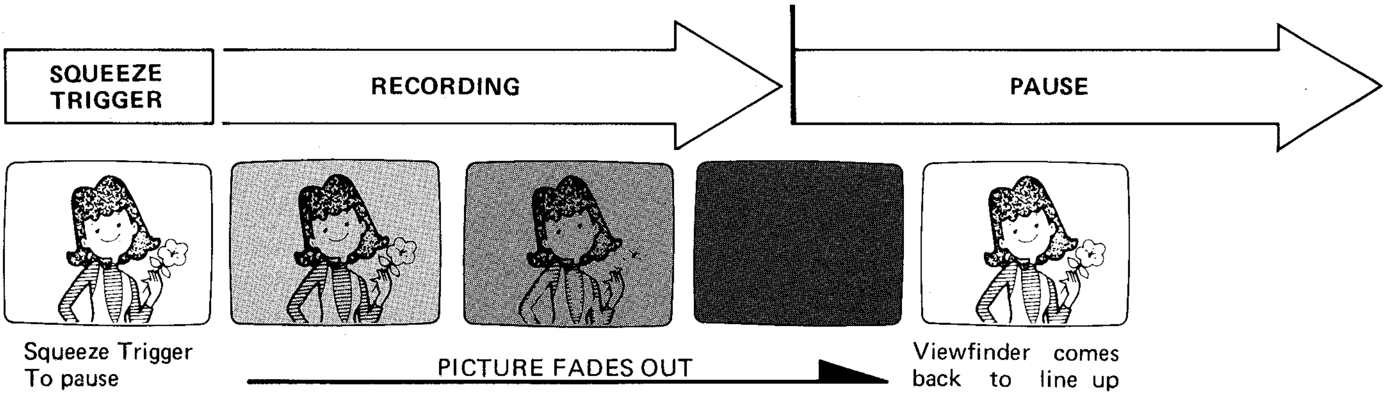
Viewfinder picture-for focus adjustment

Squeeze Trigger to record

Picture fully faded-tape starts rolling

With the fader switch on, the tape does not start rolling until the picture in the viewfinder is fully faded out. Then tape rolls as the picture fades in.

FADE OUT


SQUEEZE TRIGGER
RECORDING
PAUSE
PICTURE FADES OUT

Squeeze Trigger To pause

Viewfinder comes back to line up next shot. Tape is paused.

With fader switch on, the recorder does not pause until the picture has fully faded out. After the recorder pauses, the viewfinder picture returns in order to line up the next shot.

- **Color Temperature**

Lighting conditions vary considerably from location to location. For instance, indoor lighting is "warm" (reddish) and outdoor lighting is "bright" (bluish). To be sure that white objects appear white, the camera has a color temperature control for coarse adjustment, and automatic white balance (AWC) for fine adjustment.

Using Color Temperature and AWC, the camera's red and blue gain are adjusted to compensate for the lighting.

- **Automatic Iris Lens**

The automaitc iris in the lens adjusts the amount of light reaching the pick-up tube. If the lighting is low, the iris opens. As the lighting increases the iris narrows. By placing the Iris Control switch in the "MANUAL" position – the iris can be adjusted manually.

- **Light Intensity Indicator**

If the lighting is very low, even though the iris opens there may not be enough light for proper camera operation.
If the Light Intensity Indicator orange LED comes on, there is insufficient lighting – provide more illumination.

- **Gain Boost**

This AGC ON/OFF switch allows the gain of the camera to be increased for use in low light conditions. Set the AGC switch to "ON" if the orange LED stays on and extra lighting is not practical. In adequate lighting conditions it is preferable to set the switch to "OFF"

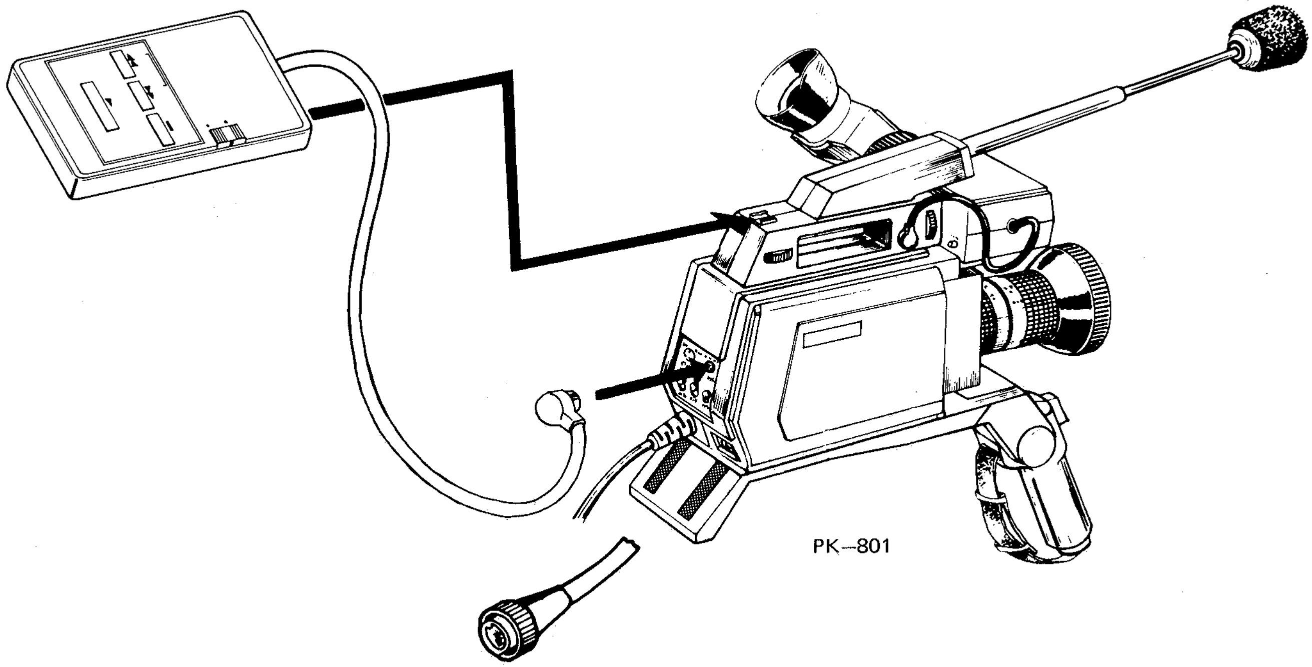
- **Automatic White Balance**

Because the color content of light changes from scene to scene, AWC adjustment should be performed when you change locations – or – even if you don't change locations and the sky becomes much more sunny or much more cloudy, AWC adjustment is indicated.

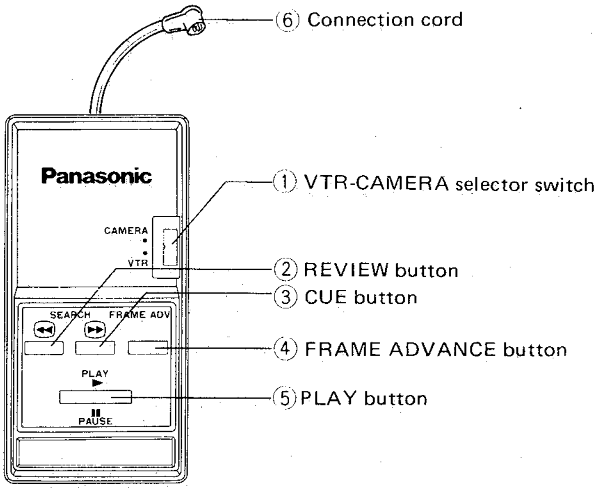
1. Be sure the camera power is ON.
2. Aim the camera at a white object (never at a light source). White lens cap may be placed on the lens if there is no white object. Be sure the intensity indicator (orange LED) is off.
3. Press the AWC button.
4. Wait for the AWC indicator to turn green.
5. You are ready to shoot.

USING THE REMOTE CONTROLLER (OPTIONAL)

If the PK–801 is used with a Panasonic PV–4000 series Portable Videotape Recorder, the Remote Controller can also be used. This allows control of the Cue and Review and some other functions of the recorder from the camera. Attach the Remote Controller to the accessory shoe, and connect the plug to the camera as shown.



CONTROLS AND THEIR FUNCTION


⑥ Connection cord
Panasonic
① VTR-CAMERA selector switch
CAMERA
VTR
② REVIEW button
③ CUE button
SEARCH
FRAME ADV
④ FRAME ADVANCE button
PLAY
⑤ PLAY button
PAUSE

① **VTR/CAMERA selector switch**
This switch determines if the recorder will either be recording or playing.
"CAMERA" position is for recording. "VTR" position is for playing back.

② **SEARCH REVERSE**
During playback, push this button continuously to obtain a reverse motion picture at 5 to 9 times of normal speed, (SLP recordings provide the best results).

③ **SEARCH FORWARD**
During playback, push this button continuoulsy to obtain a forward motion picture at 5 to 9 times of normal speed (SLP recordings provide the best results).

④ **FRAME ADVANCE**
Press and hold this button to advance frames forward.

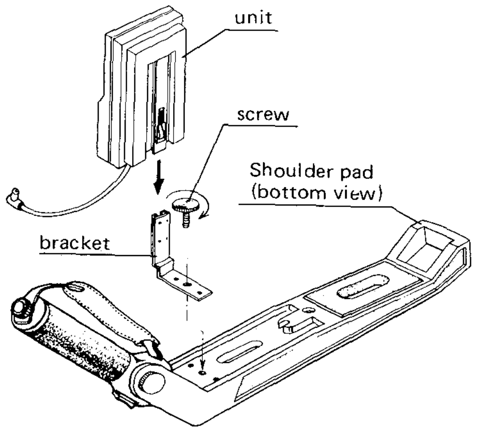
⑤ **PLAY**
This button only works when the VTR/CAMERA selector switch is in the "VTR" position.
Press this button to release or engage the playback pause mode.

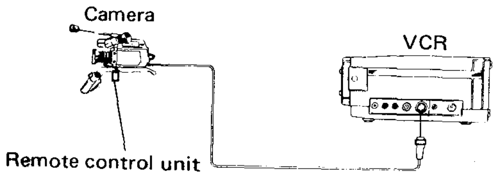
⑥ **CONNECTION CORD**
This connects to the rear of the camera.

CONNECTION

Connect the PK–R70 to the attachment bracket and then to the PK–701 or PK–801 or PK–751 or PK–771 as shown.

Then connect the plug to the rear of the camera.





OPERATION

1. Connect the PK–R70 to the camera as described on page 4. Connect the camera to the recorder. (Refer to the operating instruction of the camera you are using.)
2. Turn the recorder power "ON".
3. Set the recorder's CAMERA REMOTE switch "ON".

TO RECORD

1. Place the VTR/CAMERA switch in the "CAMERA" position.
2. Use the camera trigger to engage or release pause.

TO PLAYBACK

1. Place the VTR/CAMERA switch in the "VTR" position.
2. Use the PLAY button to engage or release pause.
3. Use search forward or reverse to locate a particular segment.
4. Use FRAME ADVANCE as desired.

TO STOP OPERATION

1. Set the camera remote switch of the recorder to "OFF".
2. Now, rewind or FF can be activated.

APPLICATION

If you are outdoors and wish to add a new section to a previously recorded tape–simply playback and use search to find the particular section. Then move the VTR/CAMERA switch to "CAMERA"–and squeeze the camera trigger to add on the new recording.

NOTES

- The CAMERA REMOTE switch on the recorder must be "ON", otherwise the PK–R70 will not operate.
- Recordings made in SLP provide the best looking SEARCH and STILL pictures.
- Switching the VTR/CAMERA selector automatically engages the pause mode–giving the user utmost control.
- The PK–R70 is for use with the PK–751, PK–801, PK–771, PK–701, and decks PV–4000 series only.
- If the safety tab of the cassette is missing, the remote control will not function.
- If the tape comes to its end while the remote control is in use – the recorder's power switch will automatically turn off.
- Avoid connecting the remote control to the camera while the power is on. This may cause the deck to misoperate.
- If a connector is plugged into the video input jack of the recorder while the remote control is in use, the recorder will stop. Subsequently, the remote control will not function.

TO PRODUCE THE BEST COLOR VIDEO PROGRAM

The PK-801 has been designed for normal scene illumination of 90 footcandles (900 lux).
An illumination of 90 footcandles (900 lux) is standard, but the camera may be used at F1.4, if illumination is more than 5 footcandles (50 lux).

•Lighting

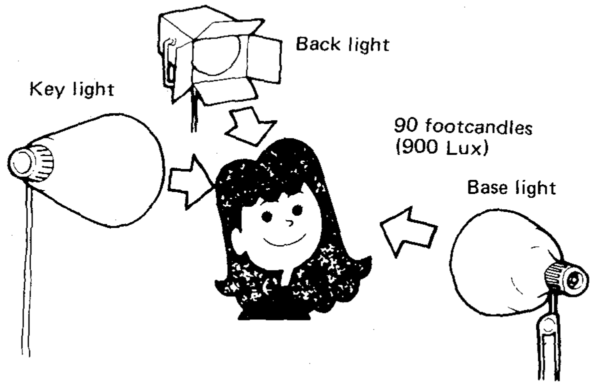
Indoor Lighting

- •Object illumination: Approx. 90 footcandles (900 lux).
- •Keep sufficient distance between the lights and the object to get uniform illumination.
- •Maintain as much brightness as possible behind the object.
- •Minimize object shadows.

These are the fundamentals for reducing the contrast ratio. To emphasize a three-dimensional effect or to add depth, use additional spot lights.

Front Light and Back Light

When using your camera outdoors, use it preferably with the sun behind you. Using your camera with the sun in front of you not only makes for difficult aperture ring adjustment, but creates a video signal with too much contrast and subdued color. If possible, zoom in on your object to fill the screen. Following these simple steps assures that your camera will produce natural color programs.

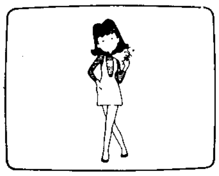


POINTERS ON HOW TO USE THE CAMERA

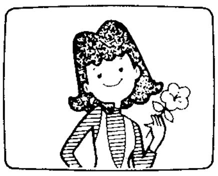
1. **Recording close up shots**

   It is recommended for various pictures that the lens is zoomed-in or zoomed-out to make an object appear larger or smaller. The camera may be operated fully zoomed-in, zoomed-out or in between for the desired result.

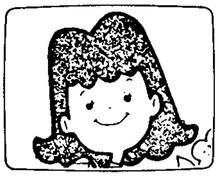
- fullshot



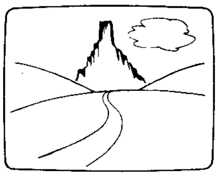
- bustshot



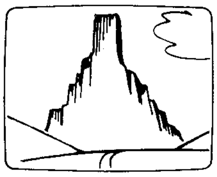
- close up



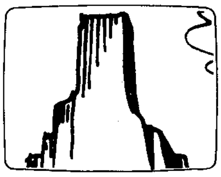
- long



- medium



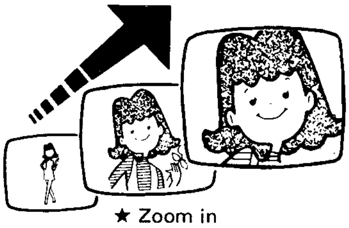
- close up



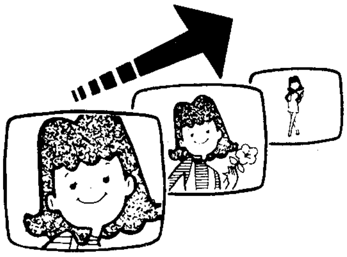
2. **Zooming**

   Zoom in . . . . . The picture gets larger.
   Zoom out . . . . The picture gets smaller.

   - Focus should be adjusted when in the zoomed-in (telephoto) position. Focus should then track over the entire zoom range. When the camera is aimed at a new scene or object, refocusing will be required.
   - Zooming-in is useful when you wish to get a closer view of the picture being recorded.



★ Zoom in

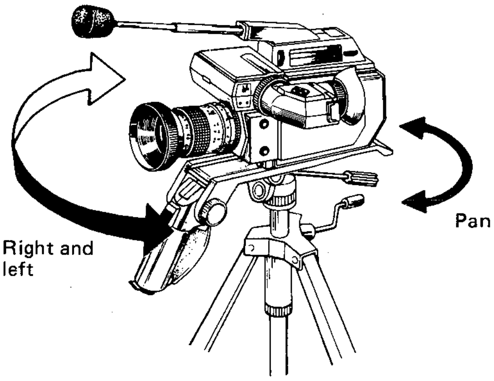


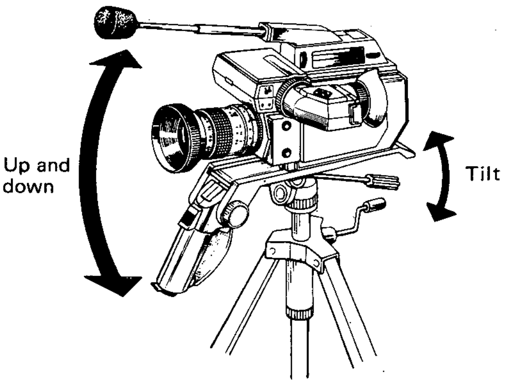
★ Zoom out

3. **Pan and Tilt**

   Pan . . . . . . Shooting right and left
   Tilt . . . . . . Shooting up and down

   - Pan and Tilt is useful when shooting an object as illustrated.
   - Be sure to move the camera slowly to prevent the picture from moving too fast.
   - Make certain that the picture is in focus during Pan and Tilt operation.



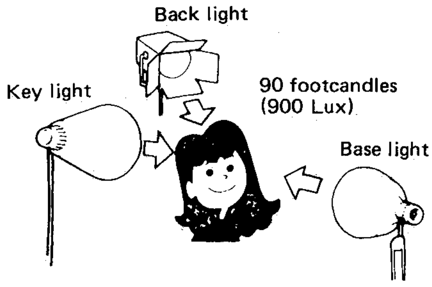


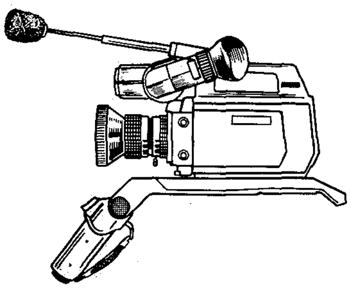
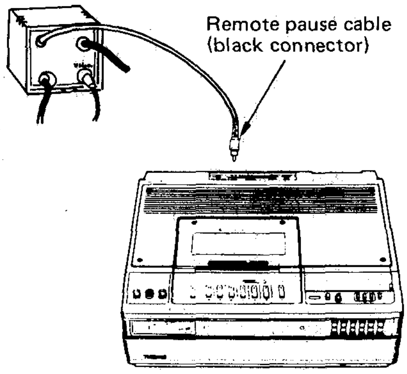
4. **Focus**

   These are shooting techniques to focus an object by rotating the focus ring on the lens. Be sure to install the camera securely;

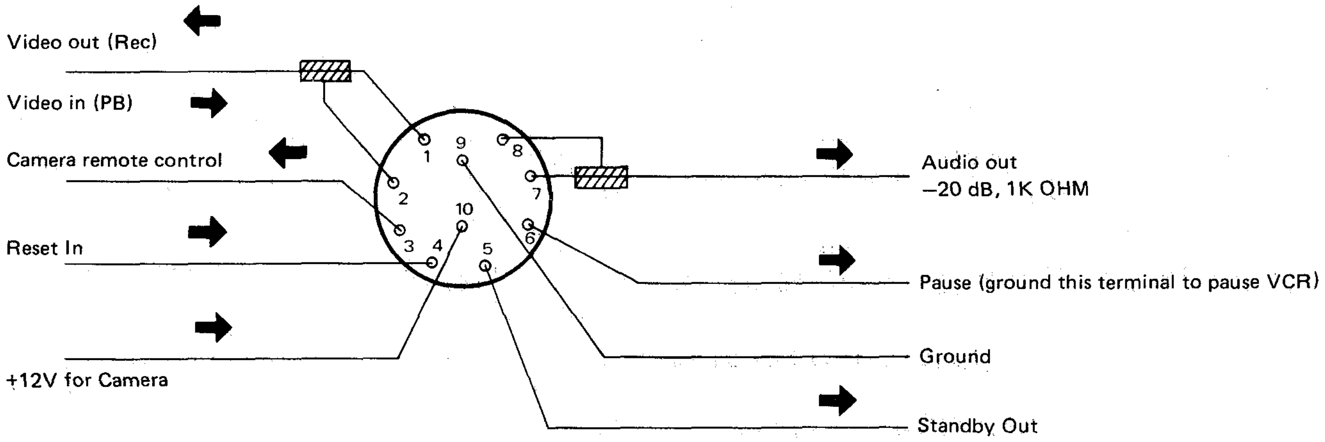
   Focus out . . . . An object changes out of focus gradually.
   Focus in . . . . . An object becomes in focus gradually.
   Focus shift . . . The focus point is shifted backward and forward.

BEFORE REQUESTING SERVICE

Condition	Main Cause and Remedy
No picture	•Check if the Power Supply is plugged in (in case the Power Supply is being used). • Check if the VCR power switch is on — and the battery is charged. •Check if all necessary cables are connected correctly. •Check if the lens cap is on. •Check if the Standby switch is set to the "Operate" position.
Color Balance not proper	•Check if the lighting is adequate. •Check the color temperature correction switch for proper setting. •AWC may need to be readjusted.
Color rendition not proper	•Check if the color TV is adjusted properly. •Check if the lighting is adequate. Insufficient lighting can considerably alter color rendition.  Back light Key light 90 footcandles (900 Lux) Base light
Viewfinder picture is upside down	•Turn camera power off. Then place the picture turning switch in the proper position.
VCR does not pause immediately when the trigger is squeezed.	•This is normal if the Fader switch is on.
Picture seems very grainy	•AGC switch should be in the "OFF" position for normal shooting.

Condition	Main Cause and Remedy
Focus is not sharp	●Check if the surface of the lens is dirty or dusty. ●Check if the lens is properly focused. 
Color for indoor or outdoor is not correct	●Check if the color temperature correction switch is properly set. ●Color control knob may need to be adjusted.
Recording does not operate	■When the Remote control is used, ●Check if the remote pause cable is correctly connected. (in case a home video recorder is used) ●Check if the camera cable is properly connected to the portable VCR.  Remote pause cable (black connector)

10 Pin Camera Connector Diagram


Video out (Rec)
Video in (PB)
Camera remote control
Reset In
+12V for Camera
1
2
3
4
5
6
7
8
9
10
Audio out
–20 dB, 1K OHM
Pause (ground this terminal to pause VCR)
Ground
Standby Out

ABBREVIATIONS USED IN THIS MANUAL

ADJ : Adjustment

Adj. : Adjustment

AFC : Automatic Frequency Control

AGC : Automatic Gain Control

AMP. : Amplifier

AWC : Automatic white Balance Control

B : Blue

BAL Balance

B.F.P. : Burst Flag Pulse

BLK : Blanking

BPF : Band Pass Filter

BSC : Blue Sub Carrier

C : Close

CB : Composite Blanking

CBA : Circuit Board Assembly.

CP-1 : Clamping Pulse 1

CP-2 ; Clamping Pulse 2

CRT : Cathode Ray Tube

CS : Composite Sync

DEF : Deflection

DET : Detector

DIFF AMP : Differential Amplifier

DL : Delay Line

DY : Deflection Yoke

ELIM : Elimination

EVF : Electronic View Finder

FBT : Fly Back Transformer

FET : Field Effect Transistor

FH : 15.75 KHz Horizontal Drive Pulse Frequency

G : Green

GB : Gated Burst Signal

GEN : Generator

H : Horizontal

HCC : High Chrominance Clip

HD : Horizontal Drive Pulse

Hd : Horizontal Drive Pulse (Delayed HD)

HP : Horizontal Parabola Waveform

Hs : Horizontal Saw-tooth Waveform

HSS : Horizontal Scanning Start Pulse

LCC : Low Chrominance Clip

LIN : Linearity

LPF : Low Pass Filter

LVL : Level

MOD : Modulation

OB : Optical Black

OSC : Osillator

OVF : Optical View Finder

PCB : Printed Circuit Board

PED : Pedestal

R : Red

REMO. CON. : Remote Control

RSC : Red Sub Carrier

SC1 : 0° Phase Sub Carrier

SC2 : 90° Phase Sub Carrier

SD : Shading Correction

SEPA. : Separation

TEMP. : Temperature

V : Vertical

VD : Vertical Drive Pulse

VP : Vertical Parabola Waveform

VS : Vertical Saw-tooth Waveform

VSS : Vertical Scanning Start Pulse

WBLK : Wide Blanking Pulse

YE : Edge Correction Input Signal

YH : Luminance Signal

YL : Low Band Luminance Signal

GENERAL DESCRIPTION

(1) SPECIAL TUBE

Special tube's features are shown as follows.

1. Less saticon burn than conventional tube.
2. Better resolution than conventional tube.
3. Much improved S/N ratio than conventional tube.

The special tube's (K9373) basic principles are same as vidicon. Special tubes are extensively used in closed-circuit TV cameras because of their small size, simplicity and ruggedness. Special tubes make use of the same basic principles as vidicon. This cameras uses a new electrostatic focus magnetic deflection 2/3" tube with an integral stripe filter. A conventional magnetic focus, magnetic deflection tube has an external focus coil (wound inside the deflection coil assembly) through which a DC current flows, forming an electron lens inside the special tube to focus the electron beam on the target. The electrostatic focus, magnetic deflection special tube has extra electrodes (G3, G4, G5) inside the special tube as shown in Fig. 1 to focus the electron beam on the target. Total power consumption of the camera is reduced by eliminating the power that would have been required for the focus coil, and the power required for deflection is also reduced. The electron beam emitted by the cathode is accelerated by the G2 electrode and passed through a beam limiting aperture (Fig. 1) to form a small diameter electron beam. The electron beam is then focused by the electrostatic lens formed by electrode G3-G4-G5, as shown in Fig. 2. This electrostatis lens replaces the focus coil and focus circuit. Electrodes G5-G6 form an independent "collimating lens" that bends the beam so that the landing angle of the electron beam is always perpendicular to the target for good corner resolution. The deflection assembly includes the beam alignment magnets (Fig. 2) which provide an auxiliary magnetic field to center the electron beam in the tube. Since the effective diameter of the focus lens is small, misadjustment of the beam alignment magnets results in poor resolution and color shading. Camera alignment therefore requires careful adjustment of the beam alignment magnets.

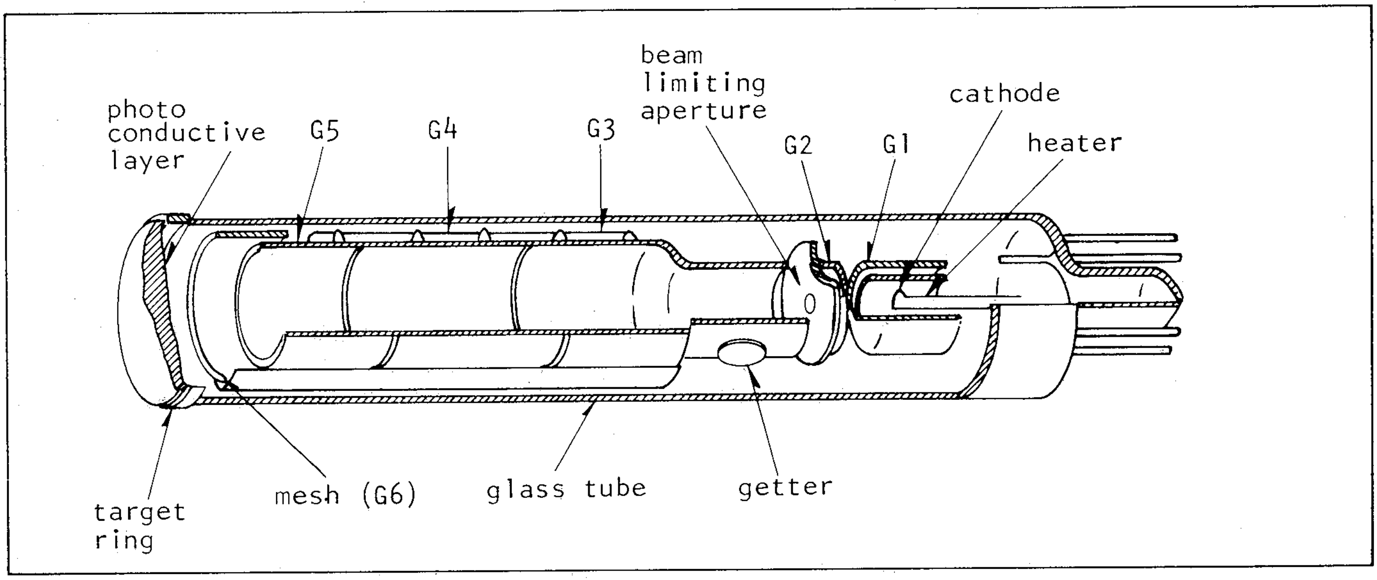
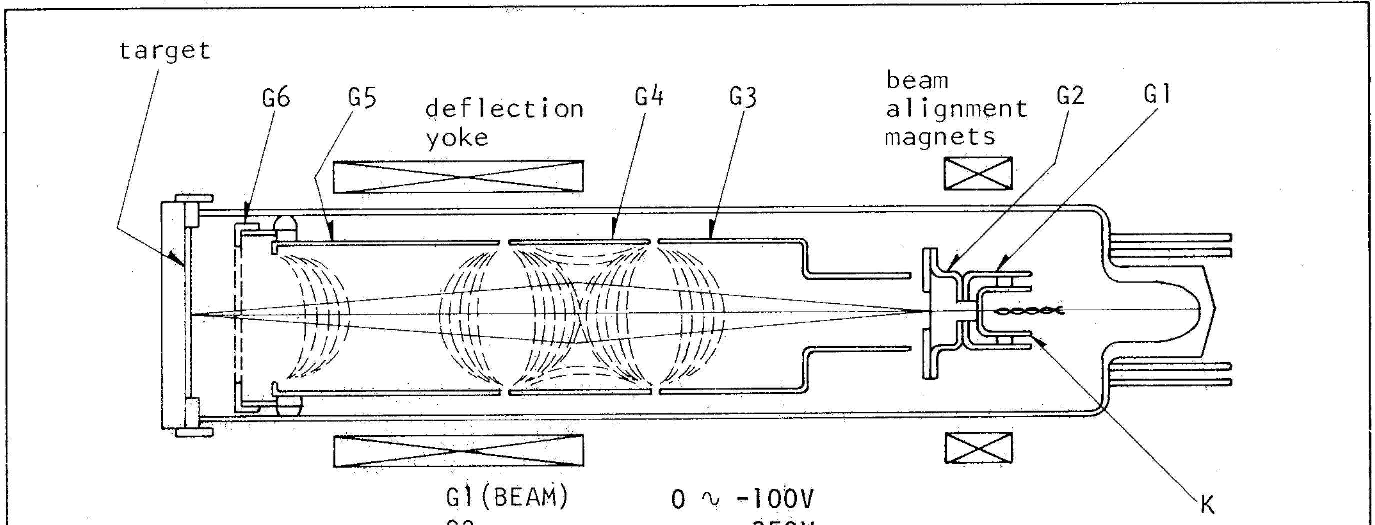

beam limiting aperture
photo conductive layer
G5
G4
G3
G2
G1
cathode
heater
target ring
mesh (G6)
glass tube
getter

Fig. 1. Construction details of the special tube

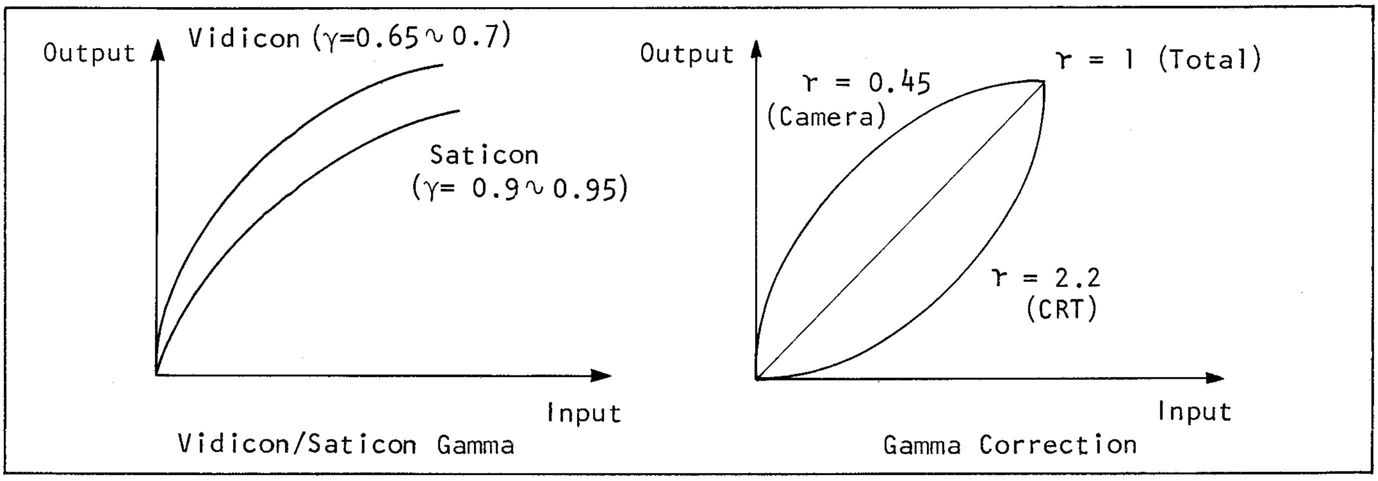

target
G6
G5
deflection yoke
G4
G3
beam alignment magnets
G2
G1
K

G1(BEAM)	0 ∿ -100V
G2	350V
G3,G6(MESH)	1400V
G4	250V (Variable: 220 ∿ 280V)
G5	700V

Fig. 2. Electrostatic focus lens and electrode details

(2) GAMMA

As light falls on the target, the signal output increases, but not at a linear rate. The relationship of light input to output signal is referred to as the gamma (γ) or transfer characteristic. Special Tubes have a gamma of about 0.9 or 0.95. The cathode ray picture tube has a transfer characteristic of its own, which is 2.2. To get a transfer of light change that is unity, the camera must use an electronic circuit to achieve a gamma of 0.45, the reciprocate of 2.2. (2.2 x 0.45 ≑ 1) This is called gamma correction.



Vidicon/Saticon Gamma

Gamma Correction

Fig. 3.

(3) STRIPE FILTER

The operation of the stripe filter on the faceplate of the special tube depends on several facts which bear review. The composition of what is perceived as white light is a mixture of many wavelengths, which we can group by wavelength or color as shown in Fig. 4-(A).

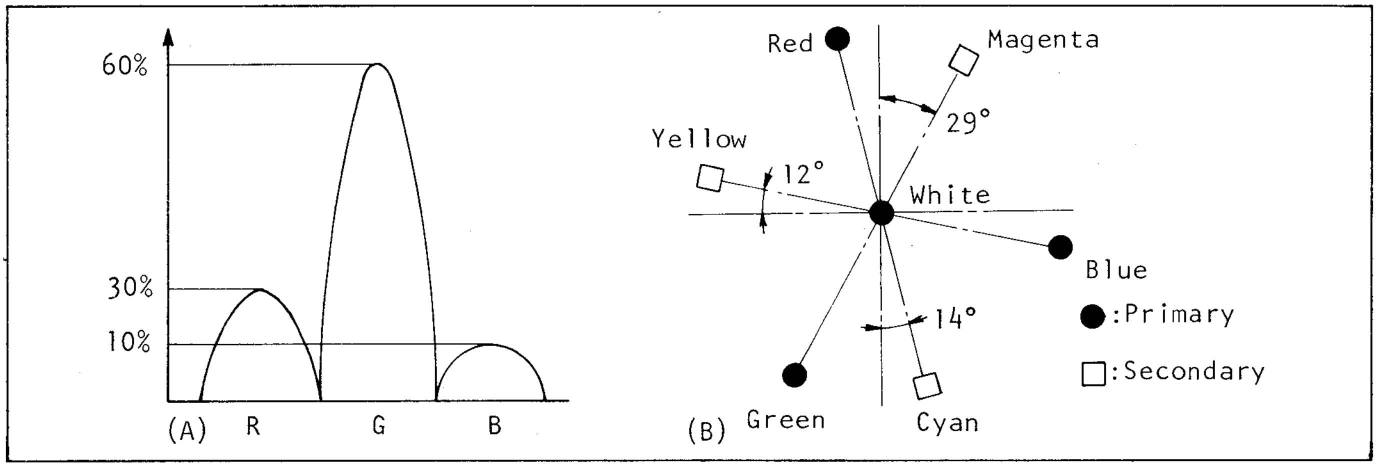


Fig. 4. Amplitude and Phase Relations Among R,G and B.

Further, while it may be apparent that all the wavelengths or colors will pass through a transparent filter, one must think of the operation of a filter of complimentary color. If a tricolor system of colorimetry is considered (Fig. 4-(B)), any two primary colors may mix to form a different secondary color which is not one of the original three primary colors but the exact opposite of the unused primary color. White light passed through a filter of this new, secondary color will contain both of the original colors but none of the complementary color. See Fig. 4, and imagine a filter of yellow, a color which is made from Red and Green.
Should white light be passed through this yellow filter, Red, Green and some of the Magenta and Cyan light will pass. But the blue light will not pass. Similarly, if a cyan filter were used, all but Red would pass. Lastly, the use of a color filter will of course allow the passage of image details--the shape, outline and reflectance of the objects seen by a lens, for example--if an image were used in place of the hypothetical white light described above.

These details form basics for the stripe filter Special tube:

1. The color of any object can be carried by the information in three primary colors.
2. When red, blue and green are used as the primary colors, 60% of the visual information and light energy is green. (Fig. 6 A)
3. A cyan filter will pass green and blue (but not red) (Fig. 5-2) and a yellow filter will pass green and red (but not blue) (Fig. 5-2). Now lets discuss the color portion of the Special tube, a thin film filter such as that depicted below is placed on the faceplate, both the filter stripes and the image from the camera lens will be in focus without the use of additional lenses.

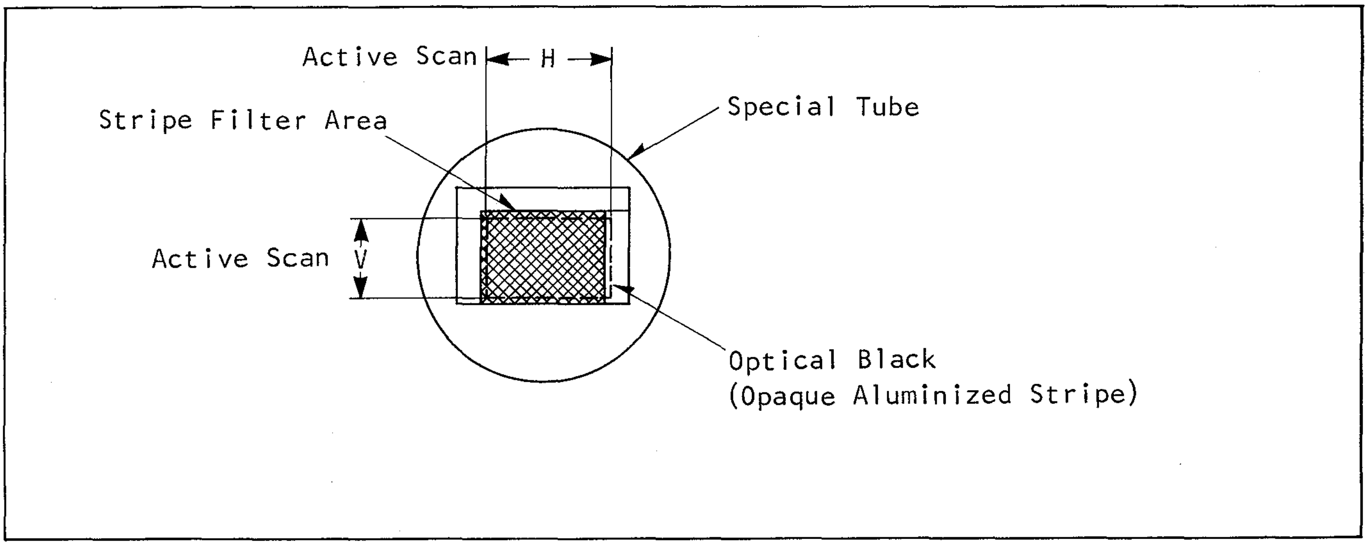


Fig. 5-1. Special Tube Faceplate

With careful design of stripe angle, size and active scan area, horizontal and vertical, the conditions described in Fig. 6 can be obtained.

COLOR STRIPE FILTER	COLOR PASSED
Transparent (Clear)	Red, Blue and Green
Cyan	Blue and Green
Yellow	Red and Green
Cyan and Yellow	Green

Fig. 5-2.

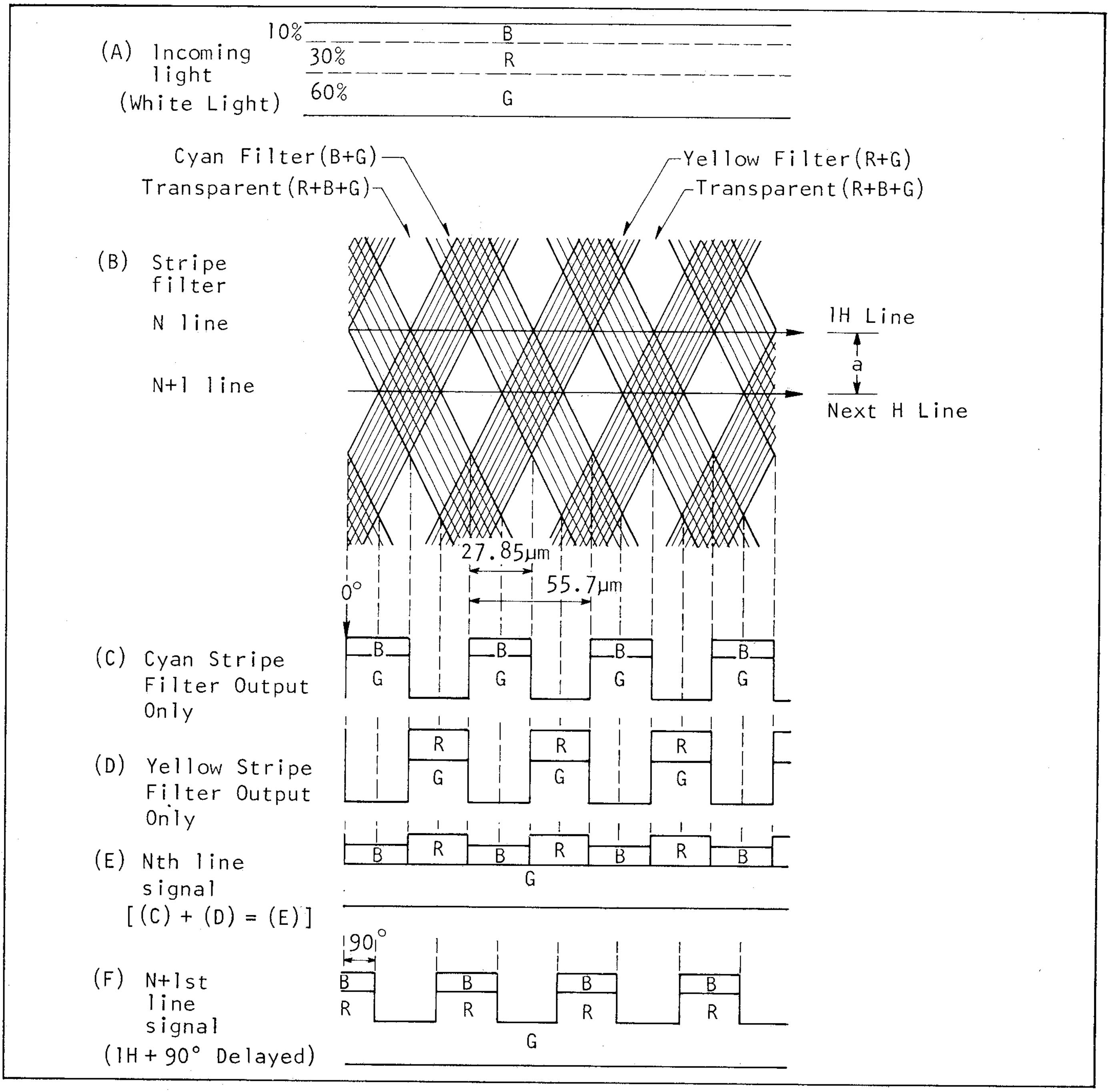

(A) Incoming light (White Light)
10%
B
30%
R
60%
G
Cyan Filter(B+G)
Transparent(R+B+G)
Yellow Filter(R+G)
Transparent(R+B+G)
(B) Stripe filter
N line
N+1 line
1H Line
a
Next H Line
27.85µm
55.7µm
0°
(C) Cyan Stripe Filter Output Only
B
G
(D) Yellow Stripe Filter Output Only
R
G
(E) Nth line signal [(C) + (D) = (E)]
B
R
G
90°
(F) N+1st line signal (1H + 90° Delayed)
B
R
G

Fig. 6. Signal from Special Tube

The tube alignment and rotation will assure that horizontal scan exactly bisects the angel formed by the stripes, and vertical scan will determine that each horizontal scan will fall as shown Fig. 6 B. Further, the width of each stripe and the horizontal scan width will determine the characteristic frequency of the process, in this case it will be 3.58MHz. As light falls on the stripes, the contrast pattern formed by stripe/no stripe/stripe will optically generates an R.F. carrier above the fundamental luminance information (picture detail). This carrier rides above the luminance.

As shown in Fig. 6. B, the integral stripe filter consists of a cyan/ transparent stripe filter section and a yellow/transparent stripe filter section.
These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and equal angle in the vertical direction. The special tube's even and odd scanning lines pass the elements of the stripe filters that are arranged in a fixed pattern. Lets assume that a white light of uniform level containing proportioned green (G), red (R) and blue (B) reaches the special tube (Fig. 6. A), and the cyan and yellow stripe filter is scanned as shown in Fig. 6. B.
The cyan filter cuts off the R. light which is complimentary to it (Fig. 6. C), and the yellow filter cuts off the B. Light which is complimentary to it (Fig. 6. D). At the N scanning line the signal E contains the modulated R. and B. signals, and G. signal. At the next horizontal scanning line N + 1, the signal F also contains the modulated R. and B. signals and G. signal. The stripe filters have the same pitch in the horizontal scanning direction, and the same angle in the vertical directions so that there is a carrier phase difference of 90° between the N line and the N + 1 line modulated signals. This modulation frequency for the R. and B. signals can be calculated from stripe width, pitch and scan width and velocity and in this case its 3.58MHz.

The incoming light is thus converted by the integrated stripe filter into a signal which contains R. and B. signals modulated by 3.58 MHz. This signal is sent to the pre-amplifier, where it is amplified (Fig. 7 G). The amplified signal G from the pre-amplifier is sent to a low pass filter circuit, which passes only the luminance (YH) signal Fig. 7 H making up the G. signal. The amplified signal G is also supplied to the band-pass filter (BPF) whose center frequency is 3.58 MHz, through which only the modulated signal I passes.
The modulated signal I is sent to the 90° phase shift circuit and the 1H (1 line) delay circuit, from which 90° phase shifted and 1H-delayed, modulated signals J and K are obtained. The modulated R. (Rc) signal (L) is obtained by adding the modulated signals (J) and (K), and a modulated B. (Bc) signal (N) is obtained by subtraction of the modulated signals (J) and (K). The Rc and Bc signals obtained by addition and subtraction are supplied to detectors, from which R. signal (M) and (B) signal (O) are obtained.

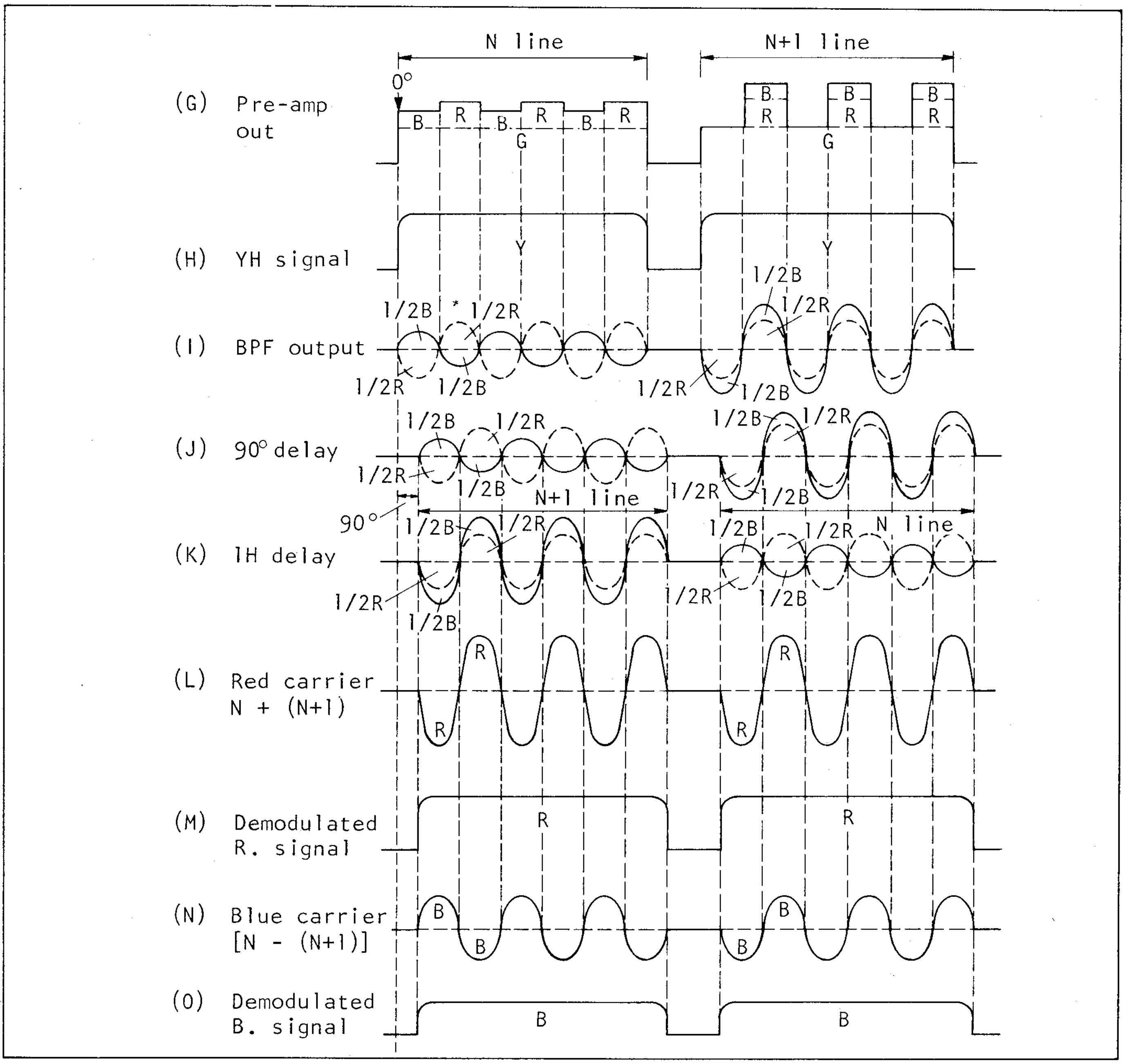

N line
N+1 line
0°
(G) Pre-amp out
B
R
G
B
R
(H) YH signal
Y
(I) BPF output
1/2B
1/2R
(J) 90° delay
1/2B
1/2R
90°
N+1 line
(K) 1H delay
1/2B
1/2R
N line
(L) Red carrier N + (N+1)
R
(M) Demodulated R. signal
R
(N) Blue carrier [N - (N+1)]
B
(O) Demodulated B. signal
B

Fig. 7-A. Detection of Y,R and B. signals

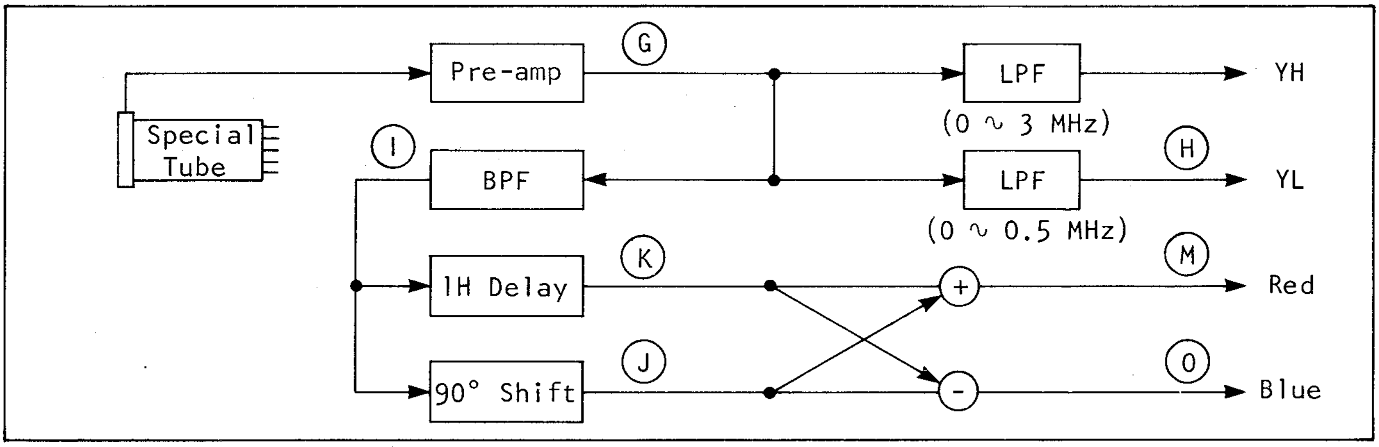

Special Tube
Pre-amp
G
LPF
(0 ∿ 3 MHz)
YH
I
BPF
LPF
(0 ∿ 0.5 MHz)
H
YL
1H Delay
K
+
M
Red
90° Shift
J
-
O
Blue

Fig. 7-B.

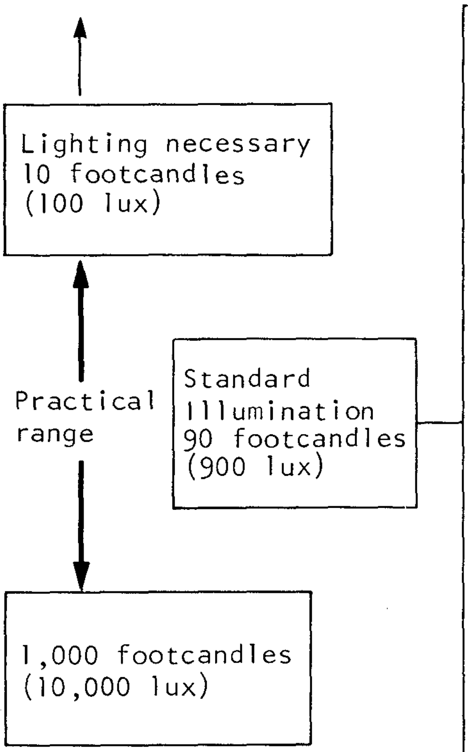
(4) CORRECTION CIRCUITS

A. Color Temperature Correction

There are two main aspects we have to consider when we think of light. The first is the brightness or intensity (Fig. 8) and the second is the color temperature.

Rough Values of Brightness

The figures in this table are approximate values for reference.


Lighting necessary
10 footcandles
(100 lux)
Practical range
Standard Illumination
90 footcandles
(900 lux)
1,000 footcandles
(10,000 lux)

[foot-candle]	[lux]	[Place or Daylight]
10	100	
	100 ∿ 200	Commercial stairways
	200 ∿ 300	Indoor golf range
	400 ∿ 500	Office with fluorescent lamps
	500 ∿ 700	Department store counter
	700 ∿ 800	Assembly line
100	1,000	
	1,000	Sunlight one hour before sunset, clear day
	1,000	Window side of an office with fluorescent lamps
	2,000	Sunlight one hour after sunrise on a cloudy day.
1,000	10,000	
	25,000	Sunlight at 10AM, cloudy day
	32,000	Sunlight at noon, cloudy day
	35,000	Sunlight at 3PM, clear day
	65,000	Sunlight at 10AM, clear day
10,000	100,000	Sunlight at noon, clear day

Fig. 8.

Light is made up of a spectrum of frequencies or colors. Violet being the lowest frequency and red being the highest (Fig. 9).

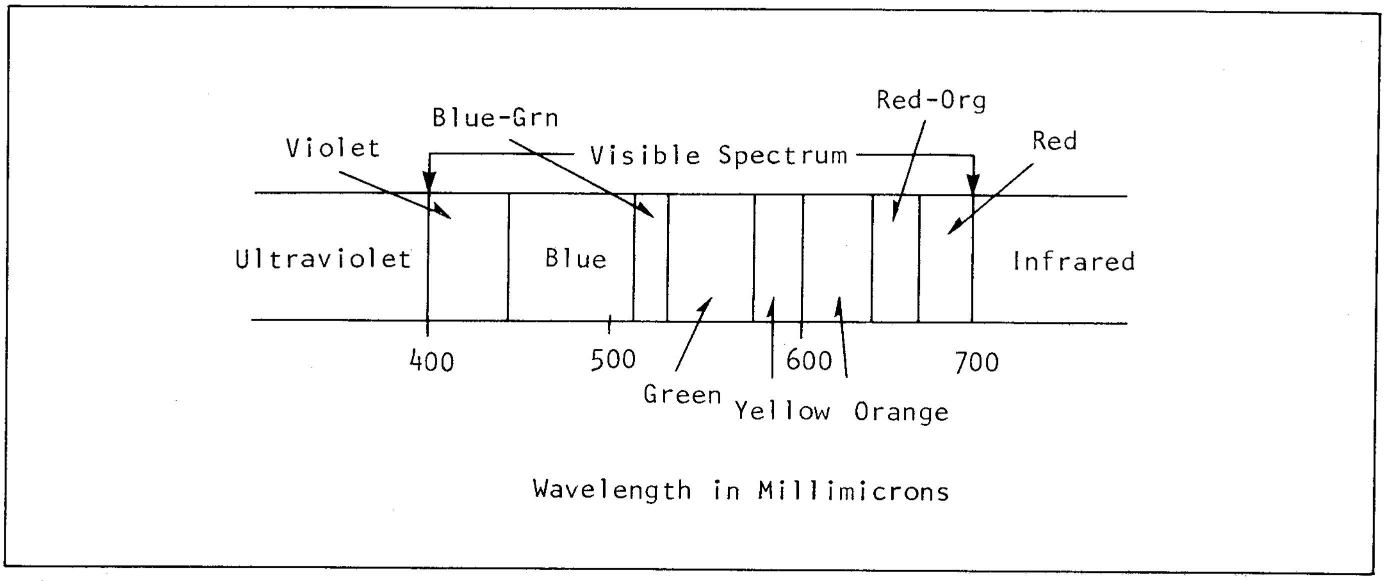

Red-Org
Blue-Grn
Red
Violet
Visible Spectrum
Ultraviolet
Blue
Infrared
400
500
600
700
Green
Yellow
Orange
Wavelength in Millimicrons

Fig. 9.

The human eye has a unique adaptability to perceive color correctly even when the light source is changed (when color temperature varies) from pure white to red-white or blue-white. However, machines do not have such adaptability, and "see" even the slightest change.

The color mix of what we perceive as white light (Fig. 10) will change

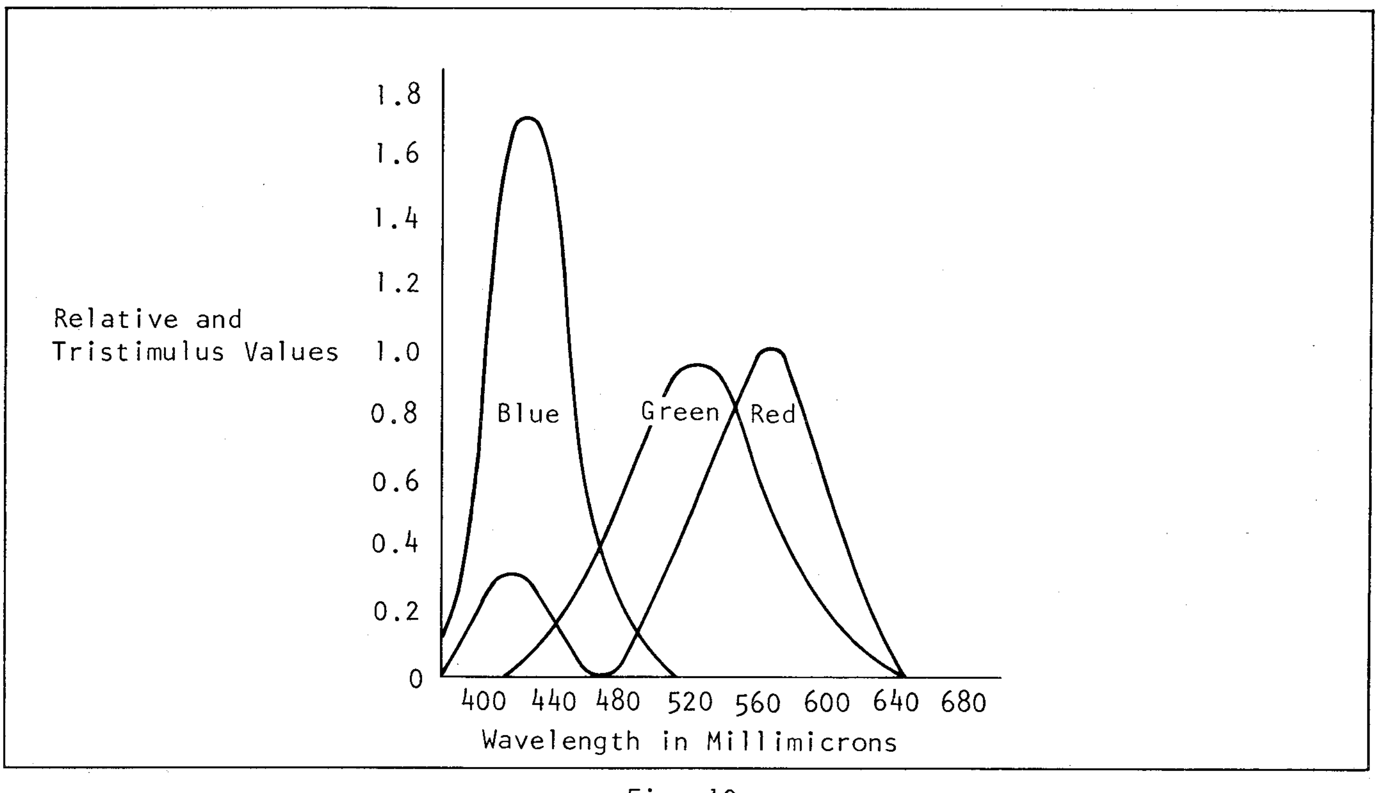


Fig. 10.

as we move from indoor artificial light to sunlight, objects illuminated by these different lights will change the proportions of the red and blue signals and the cameras output will appear to be miscolored. Cameras are normally adjusted to 3200° Kelvin Temperature (Fig. 11).

Light Source		Color Correction Switch	Color Temperature
Studio lighting such as Halogen lamp and tungsten lamp		💡	3200°K
Room light	Incandescent Lamp	💡	4500°K
	Fluorescent	▭	5000°K
Outdoor scene (sunny or overcast)		☁ ☀	5500°K

Fig. 11.

It is this reason that we have a automatic white balance control switch and color control knob mounted on the back of the camera. With these controls we can change the proportions of the red and blue signal so we can achieve a better white balance. At 3200°K we have a more reddish picture, so less gain is required in the red channel and more in the blue channel. At 5000°K or 5500°K, we have a more blueish picture and less blue gain is needed and more red.

B. V Edge Color Error Correction

As described, the Rc and Bc signals are separated from each other by addition and subtraction of the Rc/Bc signal delayed one horizontal line and the Rc/Bc signal not delayed.

When the camera views a dark to bright, or bright to dark transition as shown in Fig. 12, the Rc/Bc signal which is not delayed appears as in Fig. 12 (C), and the Rc/Bc signal delayed one line (1H) appears as in (D). When we make the transition of dark to bright the Rc/Bc (C) and (D) signals are not of equal level on the N + 1 line and a error signal (green) is caused along the vertical edge of the transition.

So it is necessary for us to supply a positive vertical (V) edge correction signal (E) to control the level of N + 1 line (F). This provides vertical correlation between Rc/Bc signals delayed and not delayed ((C) and (F)) prior to color separation. If the transition is from bright to dark, the error signal will be magenta and a negative V. correction signal will be used.

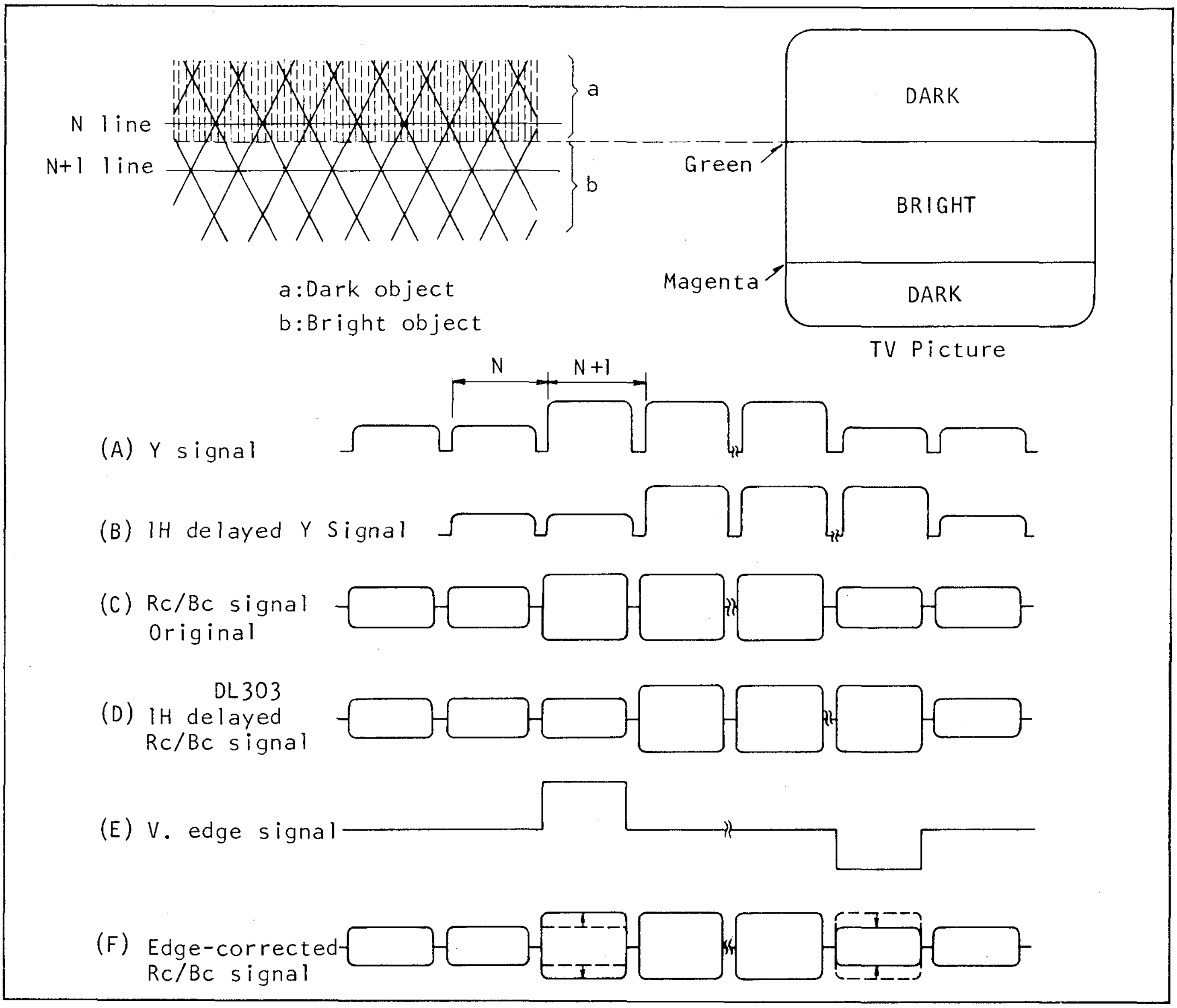

N line
N+1 line
a
b
a:Dark object
b:Bright object
Green
Magenta
DARK
BRIGHT
DARK
TV Picture
N
N+1
(A) Y signal
(B) 1H delayed Y Signal
(C) Rc/Bc signal Original
DL303
(D) 1H delayed Rc/Bc signal
(E) V. edge signal
(F) Edge-corrected Rc/Bc signal

Fig. 12. Color Correction

C. Color Shading Correction

Often the photo conductive layer on the surface of the special tube is uneven. Therefore it's necessary to correct for this uneveness electrically.
Suppose a uniformly illuminated white object is seen by the camera and the R color component signal has a shading (error) such as that shown in Fig. 13. (A). In this case, a shading correction signal (B) is generated by the shading correction circuit (which is set to the proper level during alignment). The R signal (A) is modulated by the shading correction signal (B), and a corrected R signal (C) is produced. This shading correction signal is mixed with the R signal (C) by a differential amplifier, and the R signal (D) is obtained. The color shading correction of the B signal is similar.

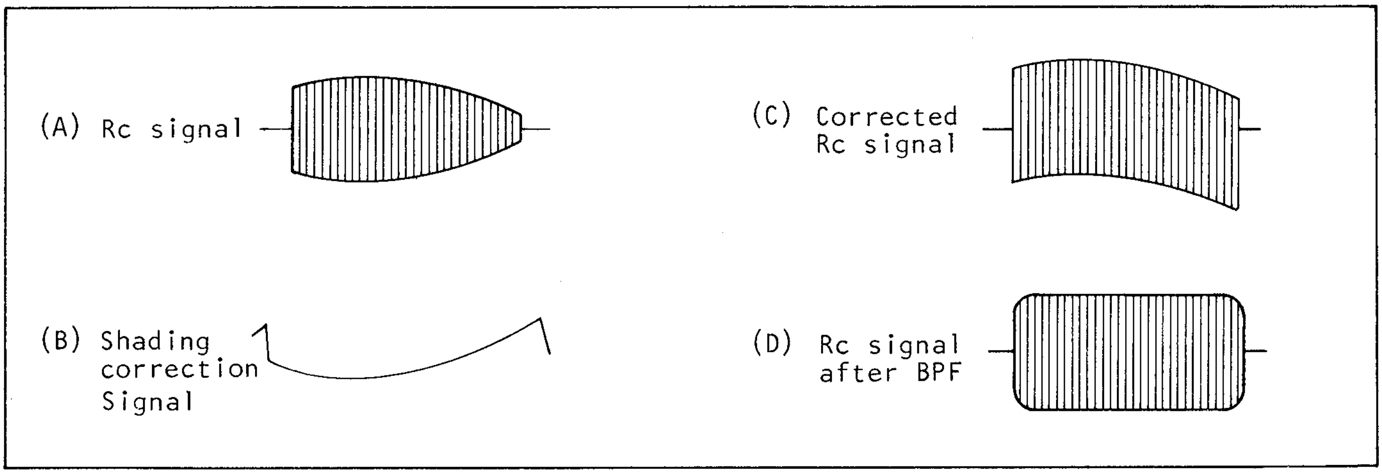


Fig. 13. Shading Correction

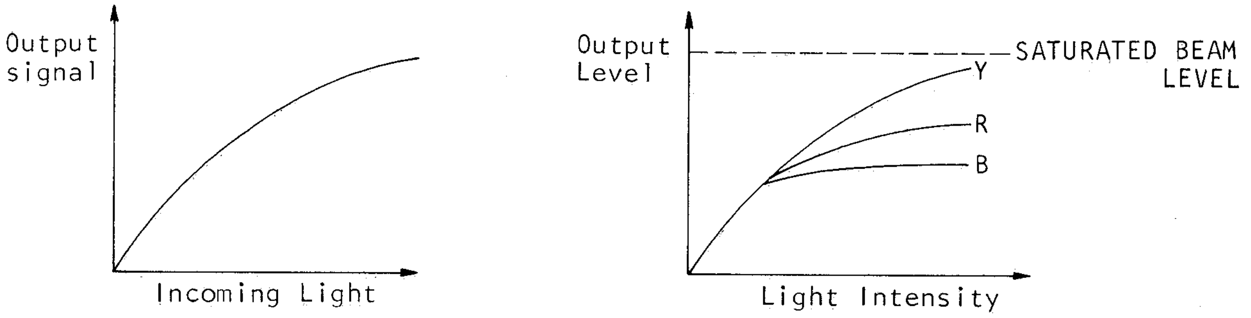
These correction waveforms are horizontal rate sawtooth and parabola. The two signals are formed from the horizontal deflection drive and injected in just the correct amount to get an over all flat color waveform.

D. Degamma Correction Circuit

As described before, the special tube does not have linear photoelectric conversion characteristics. A typical special tube gamma characteristics is shown in Fig. 14 (A). Because of this inherent characteristic, the higher levels of video signal will be compressed see Fig. 14 (B).

Since in this color camera the special tube produces a 3.58 MHz modulated red (R) and blue (B) signals, mixed with a green (G) signal [see Fig. 15 (A)], the high levels of the modulated R and B signals obtained by separating the mixed signals are also compressed (B).

The degamma correction signal circuit generates a degamma correction signal (D) to compensate for the compression of the high levels of the R and B. signals. This correction signal will be applied to both the Rc and Bc circuits as needed.



(A)
Special Tube's Gamma Characteristic-1

(B)
Characteristic of the Special Tube

Fig. 14.

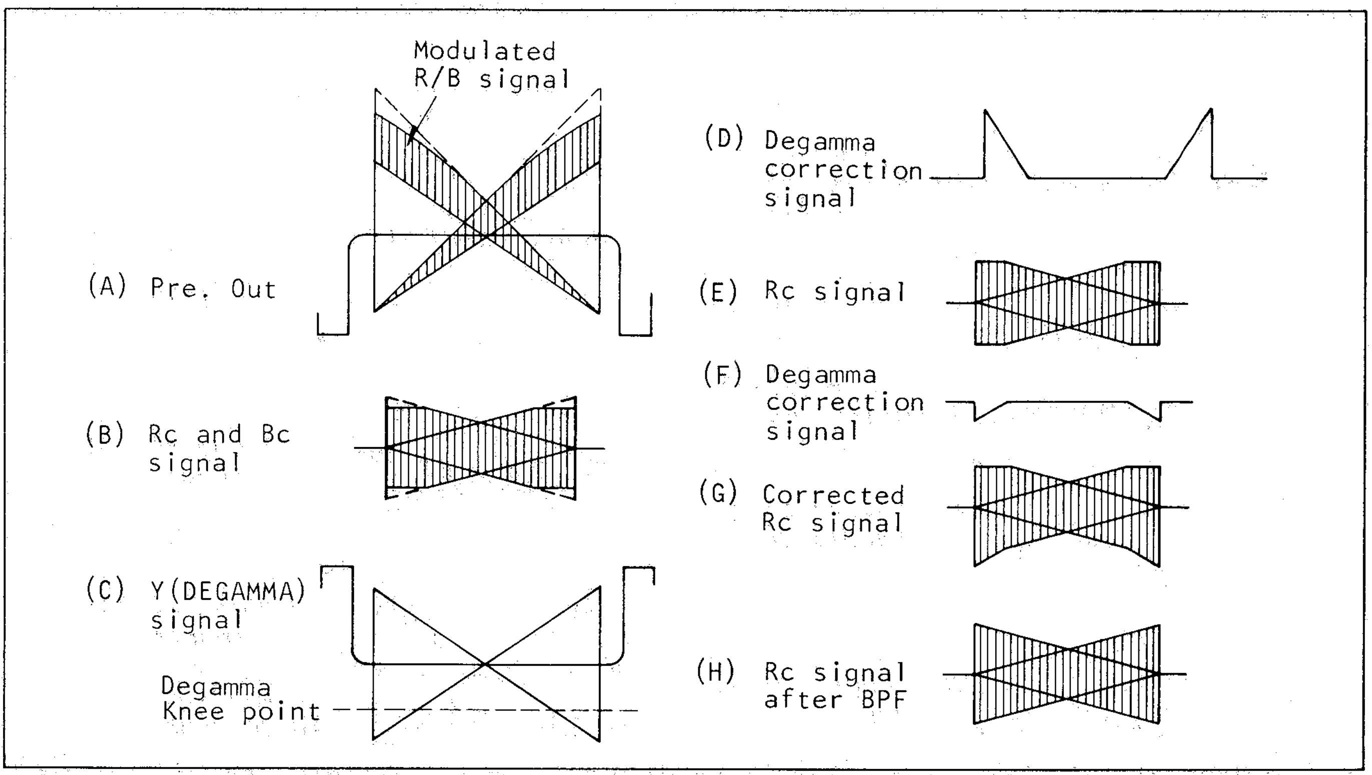

Modulated R/B signal
(A) Pre. Out
(B) Rc and Bc signal
(C) Y(DEGAMMA) signal
Degamma Knee point
(D) Degamma correction signal
(E) Rc signal
(F) Degamma correction signal
(G) Corrected Rc signal
(H) Rc signal after BPF

Fig. 15. Degamma Correction Signal

E. Optical Black clamp

A metallic strip (optional black) (Fig. 16) for cutting off the incoming light at the end of the horizontal scanning is built into the special tube. When the beam scans the optical black portion, the dark current of the special tube is sampled and this signal portion is clamped to a fixed DC potential, so that the black level variations due to a change in dark current are tracked.

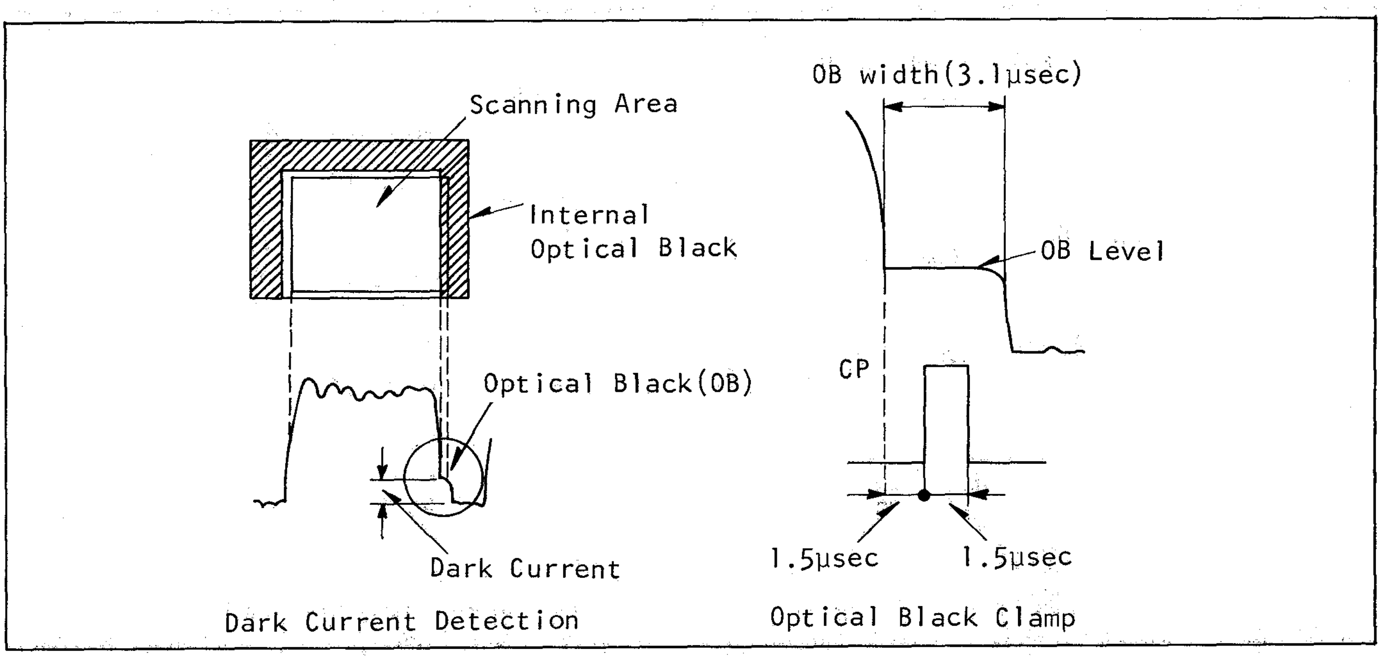

Scanning Area
Internal Optical Black
Optical Black(OB)
Dark Current
Dark Current Detection
OB width(3.1µsec)
OB Level
CP
1.5µsec
1.5µsec
Optical Black Clamp

Fig. 16.

F. High luminance chroma clip circuit

When the incoming light to the special tube is extremely high, the luminance level is increased in direct proportion to the incoming light, therefore, the modulated chroma signal from the special tube is lowered in the inverse proportion to the incoming light until it finally disappears so that a greenish picture will appear on the TV screen resulting in loss of white balance.

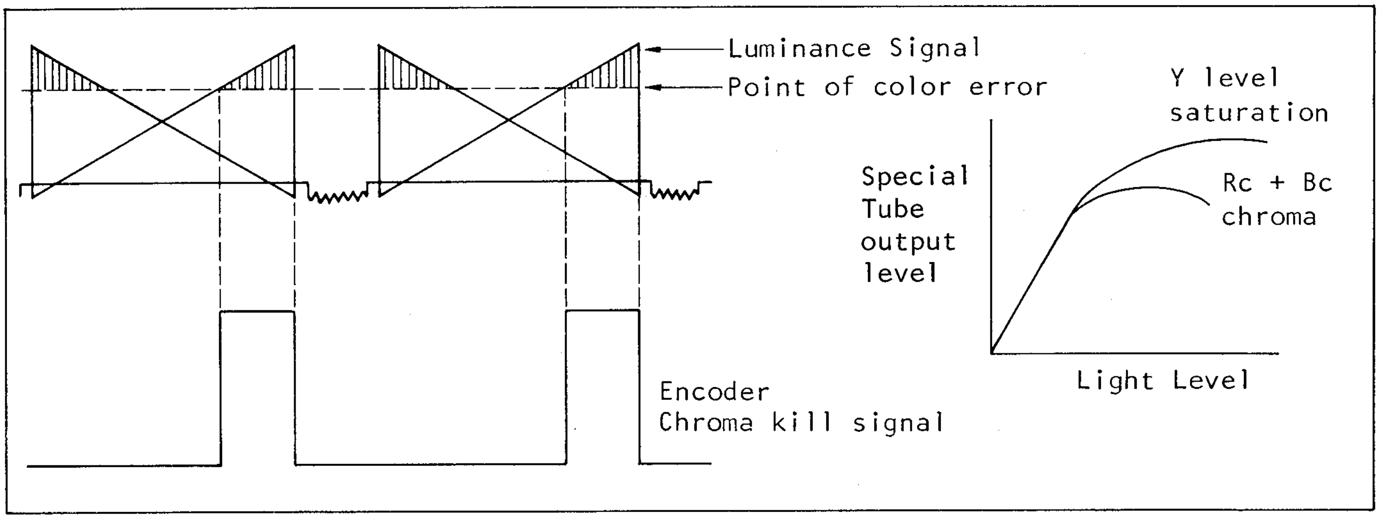

Luminance Signal
Point of color error
Encoder
Chroma kill signal
Y level saturation
Special Tube output level
Rc + Bc chroma
Light Level

Fig. 17.

Therefore, a signal will be sent to the encoder to turn off the NTSC chroma modulators at peak whites. Since the chroma information, in the NTSC signal is difference information, the lack of chroma makes the peak signal appear white, rather than miscolored (Greenish picture).

G. Horizontal Aperture Correction

The electronic beam has some thickness, so that when the electronic beam is scanned on the vidicon face or CRT, it causes some loss of resolution.

To enhance the horizontal resolution, this correction circuit generates the horizontal aperture correction signal.

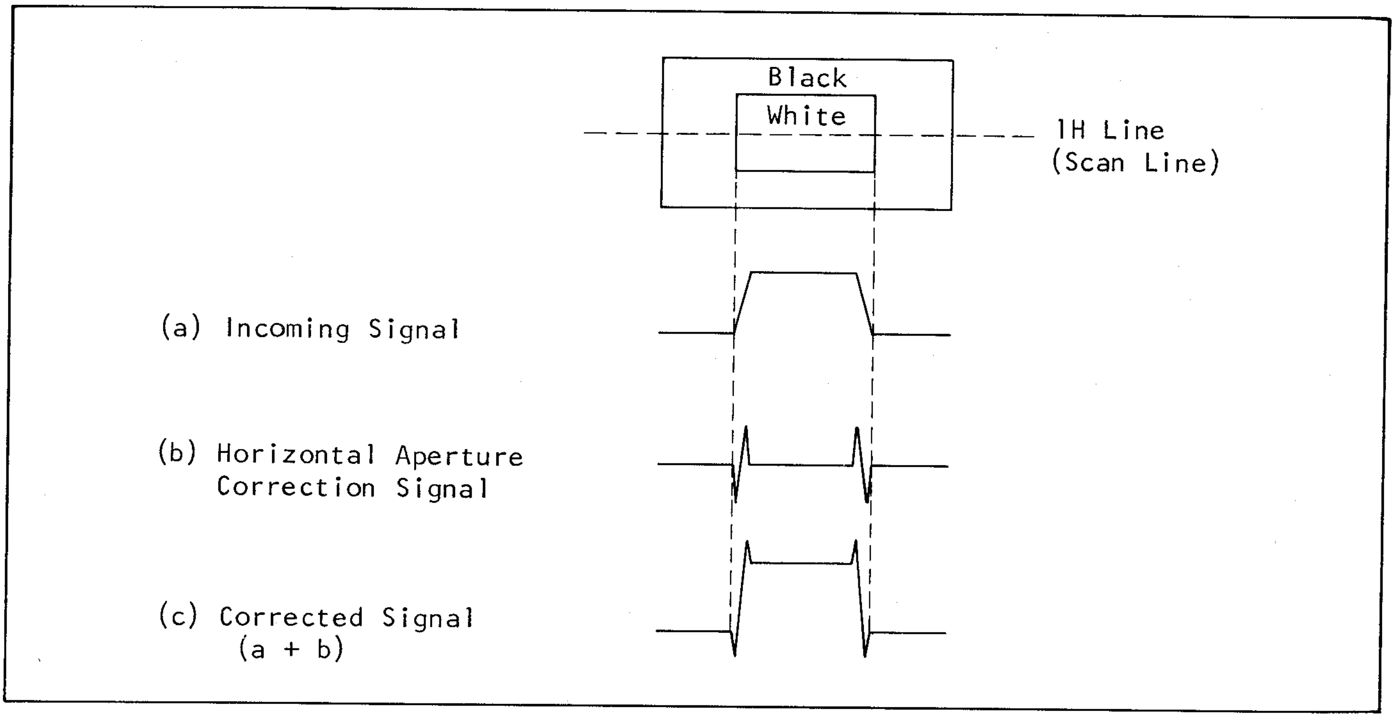
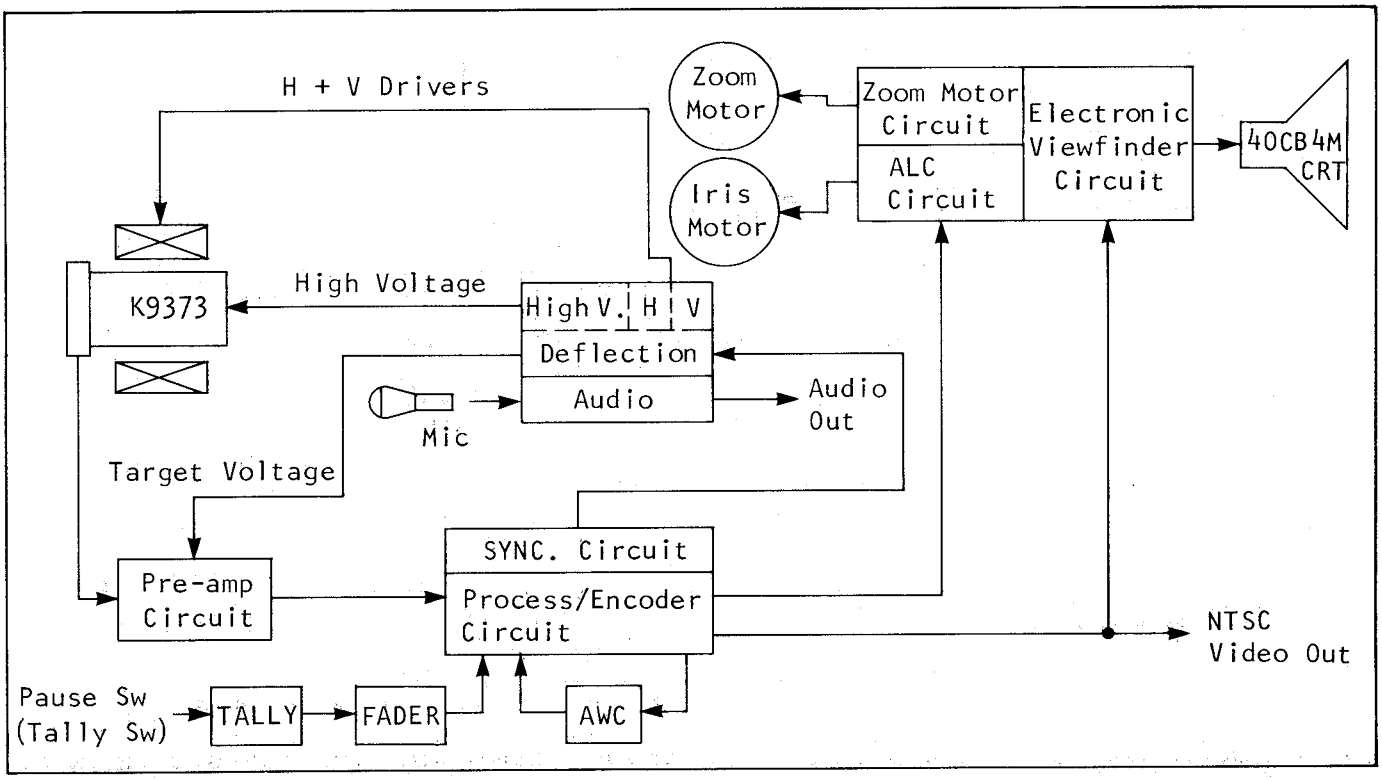

Black
White
1H Line
(Scan Line)
(a) Incoming Signal
(b) Horizontal Aperture Correction Signal
(c) Corrected Signal (a + b)

Fig. 18. Horizontal Aperture Correction

Overall Block Diagram and Description



H + V Drivers
Zoom Motor
Iris Motor
Zoom Motor Circuit
ALC Circuit
Electronic Viewfinder Circuit
40CB4M CRT
K9373
High Voltage
High V.
H
V
Deflection
Audio
Audio Out
Mic
Target Voltage
SYNC. Circuit
Pre-amp Circuit
Process/Encoder Circuit
NTSC Video Out
Pause Sw (Tally Sw)
TALLY
FADER
AWC

Fig. 19. Simplified Overall Block Diagram

Lets look at a simplified overall block diagram (Fig. 19) first. The special tube K9373 is supplied not only high voltage for tube elements, but also horizontal and vertical drives for the deflection coils wrapped around the special tube. The special tube is also supplied with a target voltage through the pre-amp. The output of the special tube which amplifies the signal by 70 dB and maintains a good S/N ratio. The signal is now sent to the process and encoder circuits to be amplified the video and to separate the luminance from the red and blue carriers.

It is also gamma and degamma corrected, V. edge corrected, color shading corrected and also temperature corrected. The signal is a also sent through a matrix to produce R-Y and B-Y components. Now the R-Y and B-Y signals are modulated with red and blue such carriers. The signal is further clip and finally sent to an AGC circuit and out to the EVF and NTSC output. The process and encoder also drives the automatic iris. The sync generator supplies the process and encoder with the necessary drives and such carriers.

Finally the camera can be powered by the VCR or with a AC power supply.

PRE-AMPLIFIER CIRCUIT

This simplified block diagram is shown in Fig. 20.

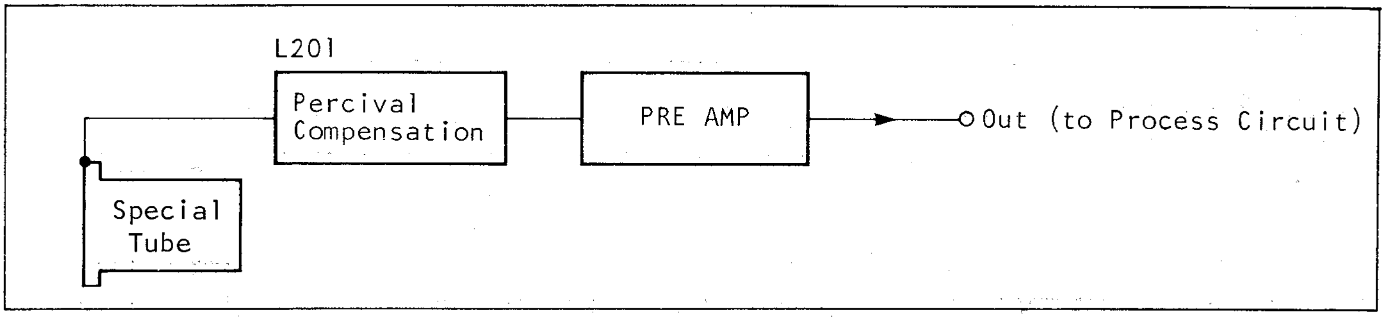


Fig. 20. Preamplifier Block Diagram

The modulated signal from tne stripe filter is applied to the Preamplifier.
As you know the output of the special tube is a very small level, about 200nA.
Therefore it has to be amplified to get a useful signal (about 70 dB up), so the S/n ratio is decided by the preamplifier circuit.

Because S/N ratio is so important in the pre-amplifier, we use a percival coil at the input. The combination of the special tube's output capacitance, percival coil and input capacitance of the pre-amplifier FET creates a resonant circuit at 3.58 MHz ± 0.5 MHz. This will improve the S/N ratio by 6 dB (Fig. 21) at the input.

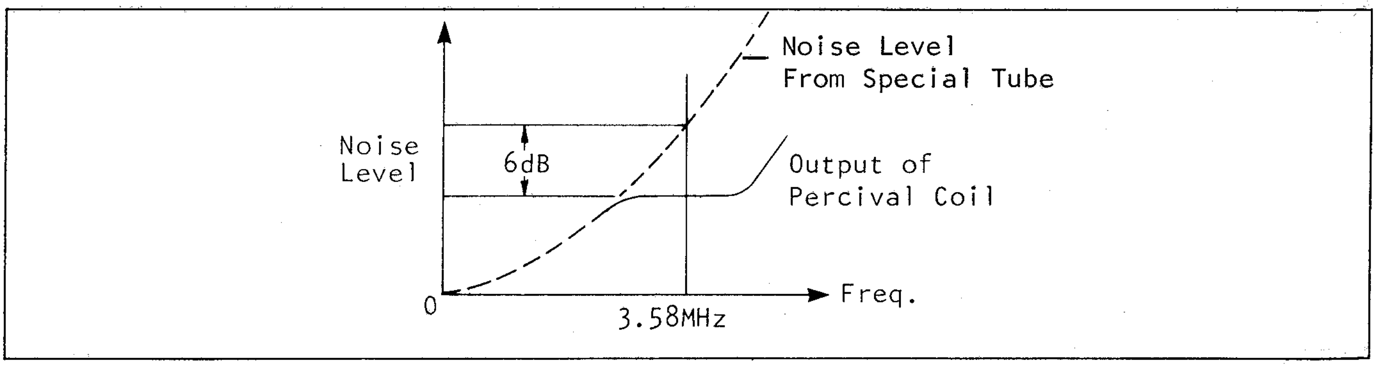
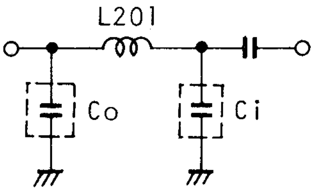


Fig. 21. Percival Correction



L201 : Percival Coil

Co : Output Capacitance of Special Tube

Ci : Input Capacitance of Preamplifier FET

Fig. 22. Percival Circuit

The preamplifier circuit is shown as following in Fig. 23.

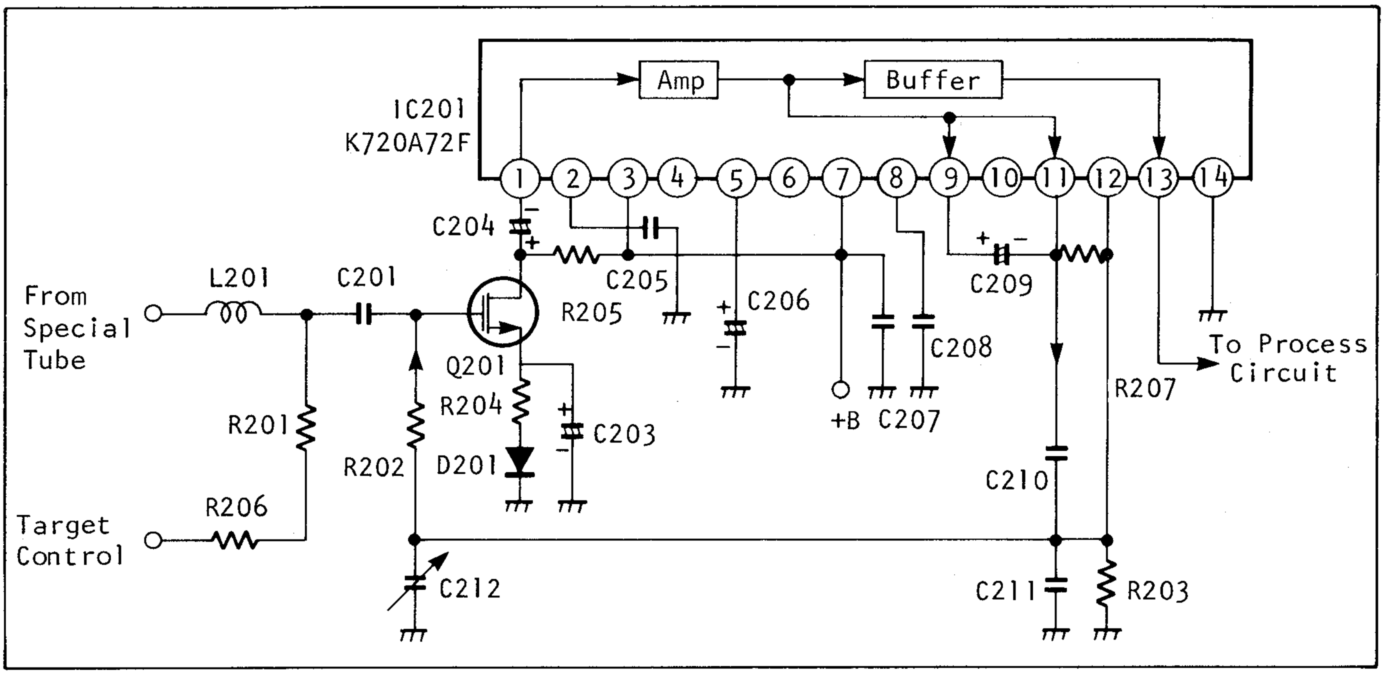

IC201
K720A72F
Amp
Buffer
1
2
3
4
5
6
7
8
9
10
11
12
13
14
C204
From Special Tube
L201
C201
C205
R205
C206
C209
C208
To Process Circuit
Q201
R204
R201
C203
+B
C207
R207
R202
D201
C210
R206
Target Control
C212
C211
R203

Fig. 23. Preamplifier Circuit

The modulated signal from the special tube is applied through the percival coil to the FET Q201 which is a low impedance amplifier. The output of Q201 is sent to the Pin (1) of IC201 through C204. Then, the amplified signal is applied to Process Circuit from the Pin (13) of IC201. From Pin (11) of IC201 there is a negative feedback path to Q201 through C210, R203, C211, C212 and R202. This feedback circuit is used to improve the S/N ratio and increase the resolution.
By using a FET in the first stage of this circuit, the S/N ratio is much better than a transistor circuit, because of short-noise with no base gating current.

PROCESS CIRCUIT

The process circuit board encompasses several functions:

AGC (Automatic Gain Control)

Video amplification

Video signal separation: luminance/chrominance

Luminance separation: high band width (YH) (0-3 MHz)/low band (YL) (0-0.5 MHz)

Chrominance separation: Red/Blue Carrier

Chrominance gamma and degamma correction (γ and deγ)

Chrominance carrier detection: Red/Blue video

NTSC Chroma Matrix (R-Y, B-Y)

The video signal from the pre-amp contains both the luminance signal (picture detail) and a 3.58 MHz carrier containing the optically generated red and blue information which was described under stripe filter theory. Note that both the optically generated carrier frequency and the NTSC color subcarrier frequency made by the pulse generator are the same frequency (3.58 MHz) but are not the same signal. The function of the process circuit is to separate this signal into its component parts, process each of the signals for optimum performance, and prepare the signals for NTSC encoding.

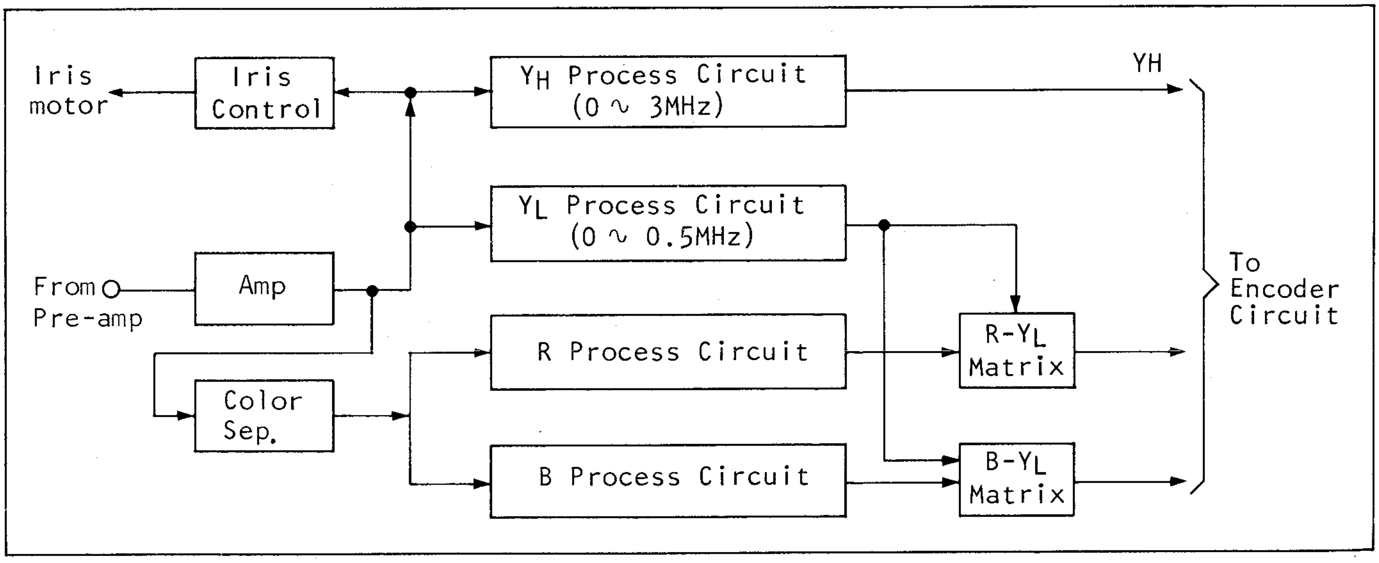

Iris motor
Iris Control
Y_H Process Circuit (0 ∿ 3MHz)
YH
Y_L Process Circuit (0 ∿ 0.5MHz)
From Pre-amp
Amp
R Process Circuit
R-Y_L Matrix
Color Sep.
B Process Circuit
B-Y_L Matrix
To Encoder Circuit

Fig. 24. Block Diagram of Process Circuit

The YH signal processing is done to form a wide bandwidth (0-3 MHz) video signal containing the picture detail. This will be the luminance component of the final output picture. The YL signal processing will form a luminance signal green of limited bandwidth (0-0.5 MHz) with a separate pedestal adjustment for the encoding process.

The Red and Blue processing circuits are virtually identical, and start with separation of Red and Blue carrier from the luminance signal, after the splitting of the Red and Blue information, color edge correction, gamma and degamma correction, color shading correction and detection are used to form 0-0.5 MHz bandwidth Red and Blue video signals. Finally the Red and Blue carrier signals are added to inverted YL to form R-YL and B-YL signals for application to the NTSC encoder modulators.

Automatic Lens Iris Control

Since the video signal amplitude depends on the light level striking the target, the video level is used to control the lens iris drive, which opens and closes the mechanical diaphragm in the lens. The lens drive mechanism is spring loaded so that when power is removed, the iris closes entirely. The motor is a limited rotation (120°) moving magnet device, much like a meter movement. The lens takes approximately 1 to 1.5 seconds to go from closed (f=45) to open (f=1.4).

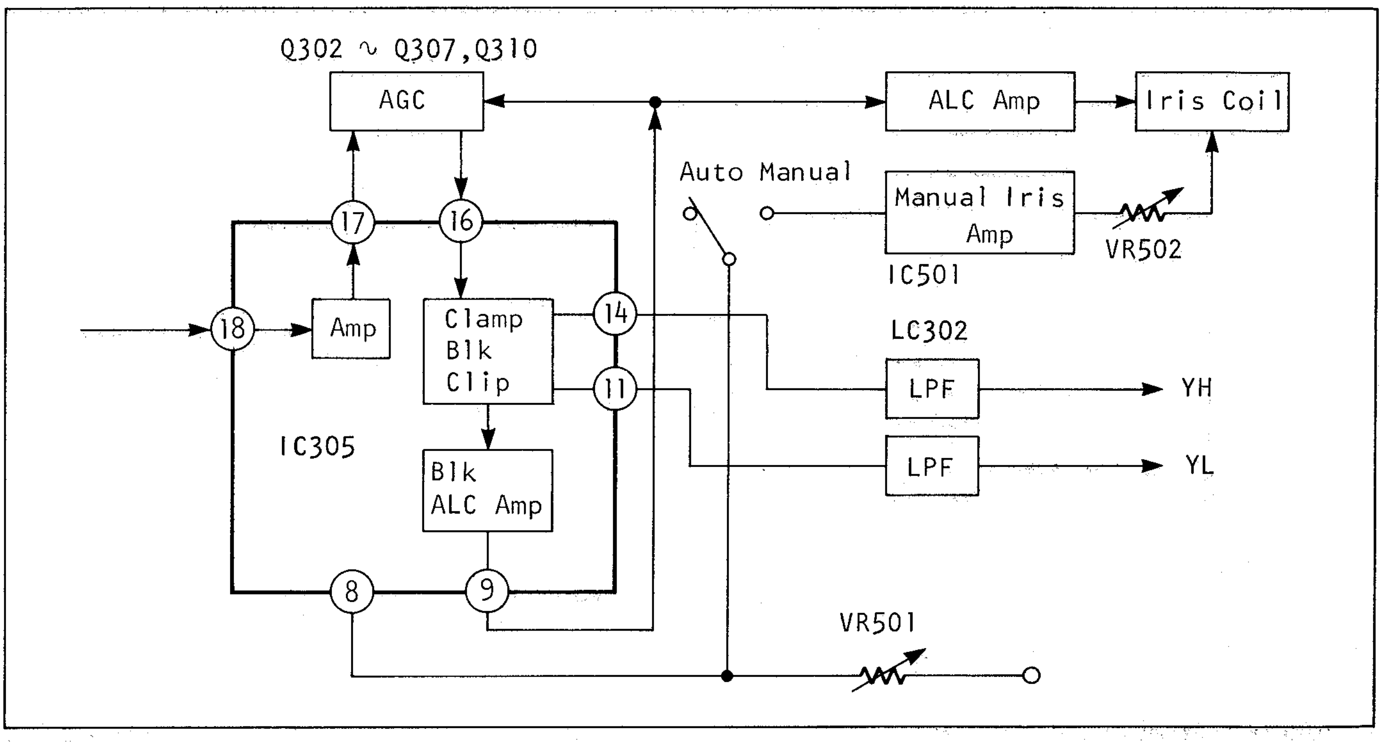

Q302 ∿ Q307,Q310
AGC
ALC Amp
Iris Coil
Auto
Manual
Manual Iris Amp
VR502
IC501
17
16
18
Amp
Clamp Blk Clip
14
11
LC302
LPF
YH
LPF
YL
IC305
Blk ALC Amp
8
9
VR501

Fig. 25. Simplified Iris Control Block Diagram

Encoder Circuit

This circuit performs the following basic functions:

1) The color difference signals (R-YL) and (B-YL) are separately AM modulate with 2 sub-carrier components whose phase differ by 90° (Fig. 26).

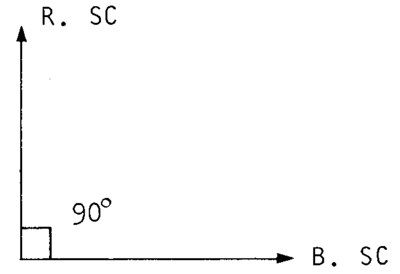


Fig. 26. The Phase Relation of R.SC-B.SC

2) When the two AM signals are added it results in a chrominance signal on a 3.58 MHz sub-carrier. The amplitude of this quadrature AM modulated signal carries information in regard to the saturation or vividness of the colors, while the relative phase (with respect to burst) carries information which specifies the hue of a particular color.
3) This signal is further processed in the Chroma Process circuits which eliminates all color in extreme high signal where perfect color reproduction is difficult to obtain (signal extremes).
4) The "1/2fh beat" prevention circuit prevents chroma amplitude (saturation) difference between adjacent horizontal lines. The line-to-line amplitude difference is a possible by-product of color decoding process. This circuit averages this difference preventing a symptom which resembles line pairing (only in color). The line pairingcaused by difference of color gain for each horizontal line is like color beat (but not real color beat).

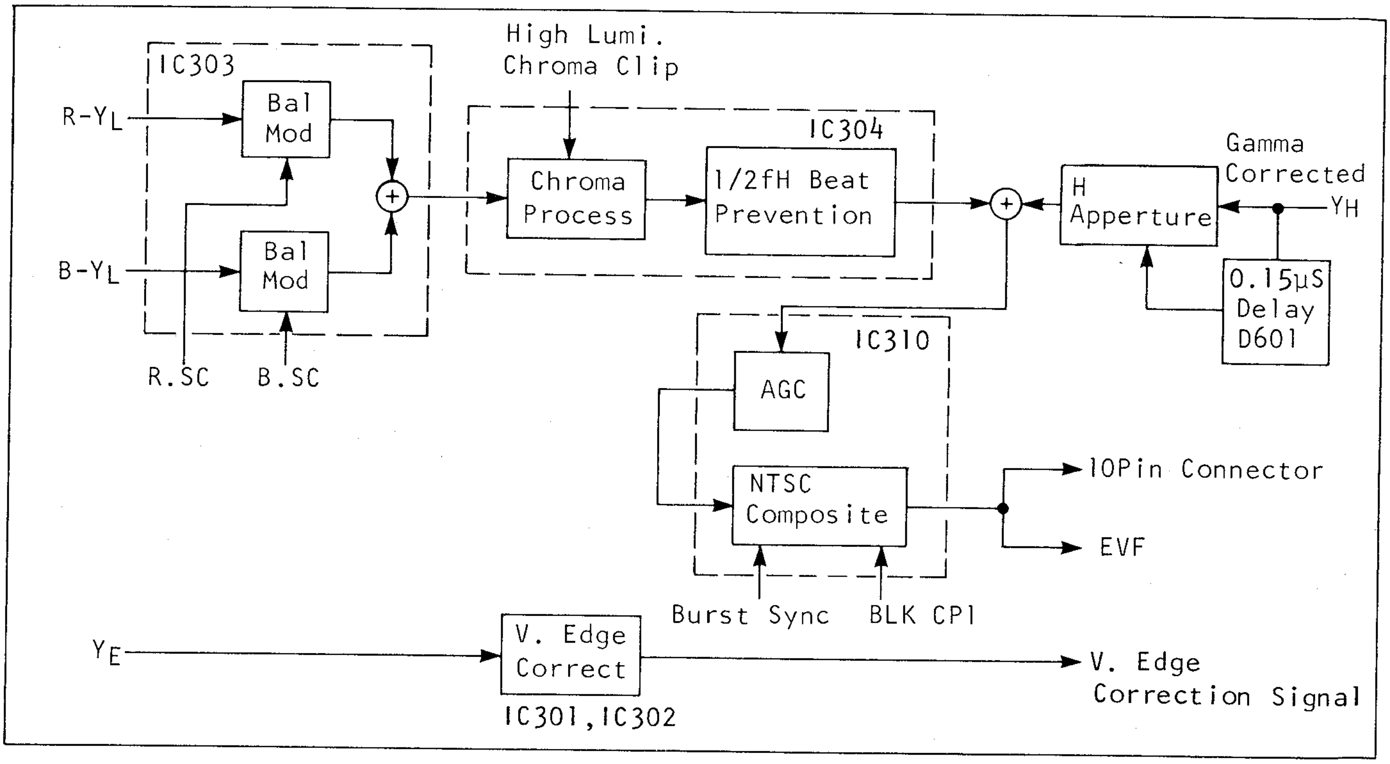

IC303
R-Y_L
Bal Mod
B-Y_L
Bal Mod
R.SC
B.SC
High Lumi. Chroma Clip
IC304
Chroma Process
1/2fH Beat Prevention
H Apperture
Gamma Corrected
Y_H
0.15µS Delay D601
IC310
AGC
NTSC Composite
Burst Sync
BLK CP1
10Pin Connector
EVF
Y_E
V. Edge Correct
IC301, IC302
V. Edge Correction Signal

Fig. 27. Block Diagram of Encoder Circuit

5) AGC is performed on the combined luminance and chroma signal (Y + C) to prevent uneven level extremes between Y and C which could affect recording performance.

6) A composite NTSC signal is formed by the addition of SYNC, BURST, and BLK. It then goes to EVF (if this option is used) and pin (1) of the 10-pin connector to the VCR. The VCR playback signal (which is sent on top of a DC level) will shut off the encoded video from the camera and route itself to the EVF during VCR playback.

7) The YE signal is sued to form an edge signal for V. Edge Correction used in the process circuit. To correct color fringing (Mg of Gr) in picture parts which contain line-to-line contrast.

DEFLECTION CIRCUIT

Main Functions

1. Generate Deflection Waveforms
   a. H Deflection
   b. V Deflection
   c. Special Tube Protection
2. Generate High Voltage to Operate Special Tube
   a. Target
   b. Grids
   c. Cathode Blanking
3. Special Tube Compensation
   a. Dark Shading
   b. Dynamic Focus
   c. Color (Signal) Shading

1. Generation of Deflection Waveforms

Horizontal and vertical beam deflection is accomplished by the H and V deflection signals sent through the deflection coils.

The H and V deflection signals are sawtooth waveforms generated by both transistors and IC, then amplified and controlled by their own IC stages. The V deflection signal is a near-perfect sawtooth.

This yields a very linear vertical sweep of the special tube target.

The H deflection signal is a somewhat distorted sawtooth.

This is done to ensure a linear horizontal scan start even after the extremely rapid retrace at the end of each line scan.

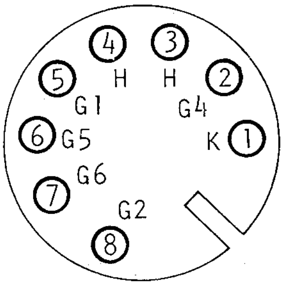
If either of the deflection signals failed for any reason, the beam would continually scan either one horizontal or one vertical line on the target. Or, if both failed, the beam would be concentrated on one spot in the center of the target. Any of these conditions can burn the target--and this is not desirable.

Special tube protection is incorporated so that if any deflection signals fail--the flyback transformer (T601) used to make the high voltage to operate the vidicon will be disabled.

2. Generation of High Voltage to Operate Special Tube

The special tube, being a vacuum tube, requires high voltage in order to create an electron beam.
Grid voltages up to 1600V DC are required. Focus, beam, and cathode voltages are also necessary.
The high voltage DC is derived from a fly back transformer. The horizontal signal is used to make high voltage because it is easier to generate high voltages from high frequency signal with transformer action.
The counted down H deflection signal is used in the primary winding of a step-up transformer and the output is diodecapacitor quadrupled to obtain up to 1600V DC.

Voltages Required		
Grid 6 (MESH) G3	1400V	
Grid 5	700V	
Grid 4 (FOCUS)	250V	(variable 220 ∿ 280V)
Grid 2	350V	
Grid 1 (BEAM)	-30V	(Variable 0 ∿ -100V)
TARGET	50V	(variable 0 ∿ 80V)
CATHODE BLANKING	20Vp-p	



Special Tube Socket

Fig. 28.

Cathode blanking signals are a combination of H & V drive signals which turn the electron beam off during Vertical and Horizontal retrace. There is no picture information needed at these times--so to prevent noise--the beam is turned off.

3. Compensation Circuits

There are inherent imperfections in any special tubes--striped or not. Compensation circuits are used to make correct these imperfection and make a better picture. The K9373 used here is striped and uses an optical black (O.B.) strip.
The O.B. strip prevents light from reaching the target just at the area at the end of horizontal scan.

The "no-light" signal output from the tube when O.B. is scanned is used as a black reference for the picture. The area of the target behind O.B. never receives light, and behaves differently from the lighted area of the target. Another form of compensation which applies a signal to the special tube cathode is Dark Shading. All areas of the target may not be equal due to manufacturing. The target can yield slightly different responses at its corners compared to the center, etc. A horizontal rate sawtooth signal and a horizontal rate parabolic signal are adjustably combined and added to the O.B. Offset signal, amplified and applied to the cathode. This should pretty much compensate for target imperfections.

Another set of compensation signals applied to the special tube is Dynamic Focus. In order for the special tube to produce good color signals, the beam must stay in focus throughout its entire area of scan.

The main focus grid provides good focus, but it can only be guaranteed in the center of the target.

But at other areas of scan, the beam focus can vary slightly.

To compensate for this, correction signals are applied to the focus grid along with the focus voltage.

There are four waveforms that make up the dynamic focus signal--H & V sawtooth, and H & V parabola. All are adjustable in both polarity and amplitude, are mixed together in a single transistor amplifier.

There are also dedicated stages used to make parabolic waveforms out of the sawtooth waveforms obtained from the deflection stages.

The H, V sawtooth and parabolic waveforms are also used in another compensation circuit. In two circuits very similar to the dynamic focus stage, correction signals are developed for use on the signal processing board. These are the Red Color Shading signals and the Blue Color Shading signals, used by the red and blue signal detectors, respectively. The purpose of the Color Shading signals is to allow for very uniform color reproduction over the entire area of target scan--compensating for imperfections again in the target structure or even the color stripe filter built in the faceplate.

4. Low Voltage Power Supply

The camera operates on +9V DC regulated down from a +12V DC source. A standard zener referred power circuit is used.

PULSE GENERATOR CIRCUIT

This circuit will generate all the pulses needed by the camera. The pulse generator (Fig. 29.) has 6.6 V supplied to pin (1) and 14.31818 MHz supplied by X302 X'tal.

From the 14.31818 MHz signal, we develope the necessary signals listed in Fig. 30.

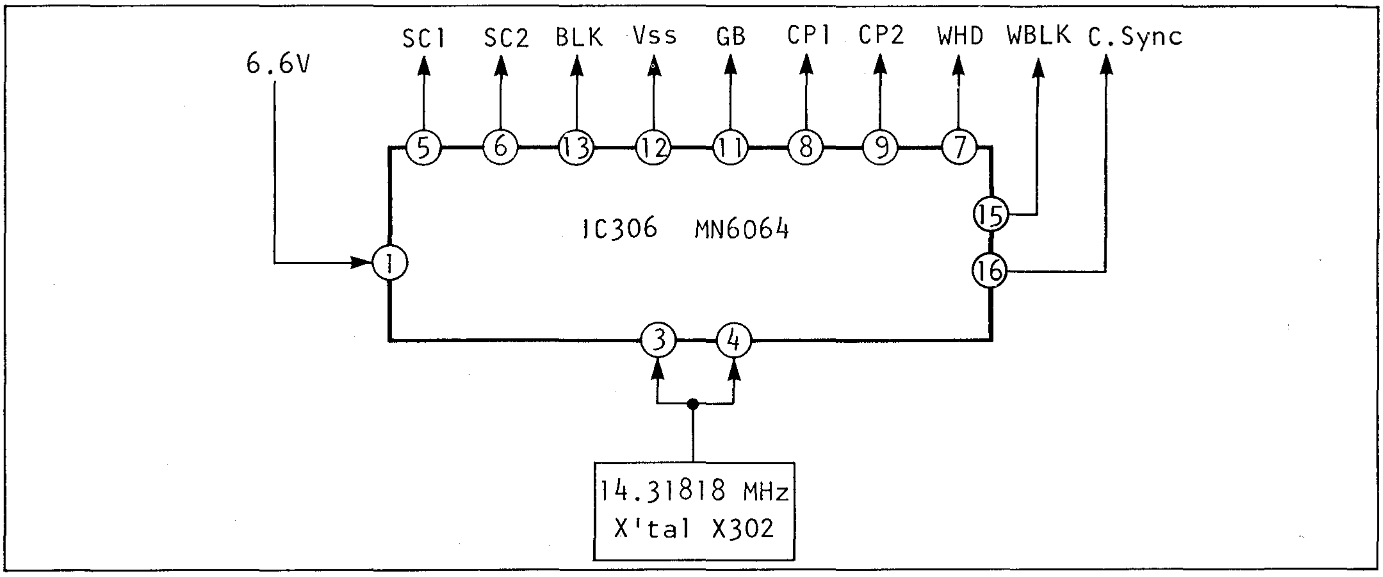
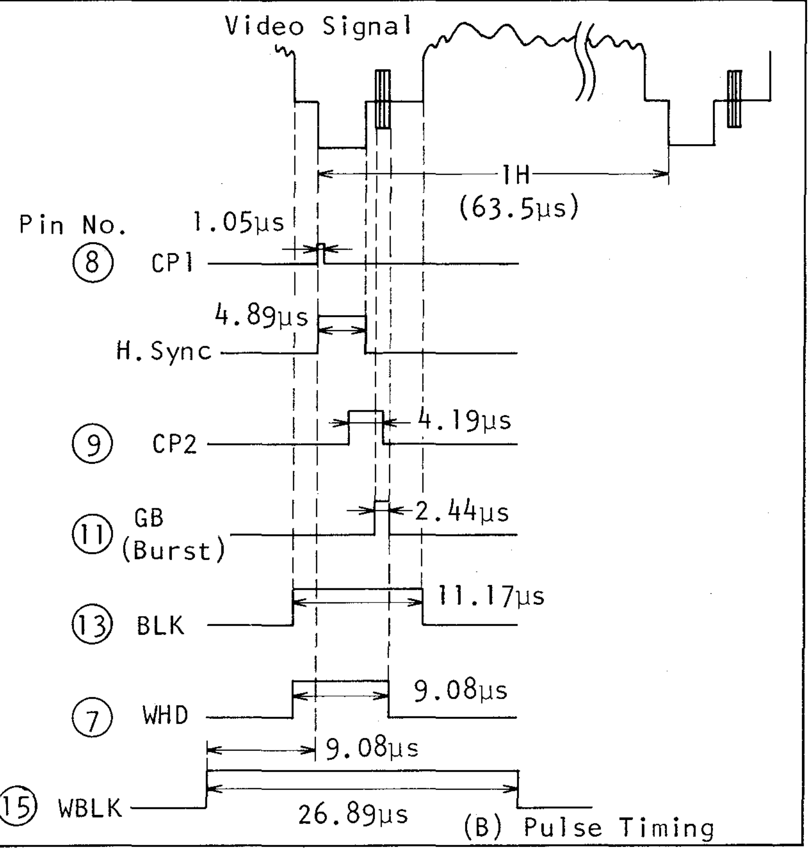

6.6V
SC1
SC2
BLK
Vss
GB
CP1
CP2
WHD
WBLK
C.Sync
⑤
⑥
⑬
⑫
⑪
⑧
⑨
⑦
⑮
⑯
①
③
④
IC306 MN6064
14.31818 MHz
X'tal X302

Fig. 29. Pulse Generator Circuit

IC306

- Pin 5 :SC1 (0°Phase Subcarrier)
- Pin 6 :SC2 (90°Phase Subcarrier)
- Pin 7 :WHD (Wide Horizontal Drive Pulse)
- Pin 8 :CP1 (Clamp Pulse 1)
- Pin 9 :CP2 (CLAMP Pulse 2)
- Pin 11:GB (Gated Burst Signal)
- Pin 12:Vss (Vertical Scanning Start Pulse)
- Pin 13:BLK (Composite Blanking Pulse)
- Pin 15:WBLK (Wide Blanking Pulse)
- Pin 16:C.Sync. (Composite Sync Pulse)

(A) Generated Pulse


Video Signal
1H
(63.5μs)
Pin No.
1.05μs
⑧ CP1
4.89μs
H.Sync
⑨ CP2
4.19μs
⑪ GB (Burst)
2.44μs
⑬ BLK
11.17μs
⑦ WHD
9.08μs
9.08μs
⑮ WBLK
26.89μs

(B) Pulse Timing

Fig. 30. Generated Pulses

9 VOLT REGULATOR

The +9V adjustment is VR620 , in the voltage divider base of Q632 . Adjust for +9V DC under loaded conditions.

Functions:
- Q632 -- Error Amp
- Q633 -- Error Amp
- Q635 -- Switching (Standby/Operate)
- Q634 -- AVR Drive
- Q655 -- AVR Out

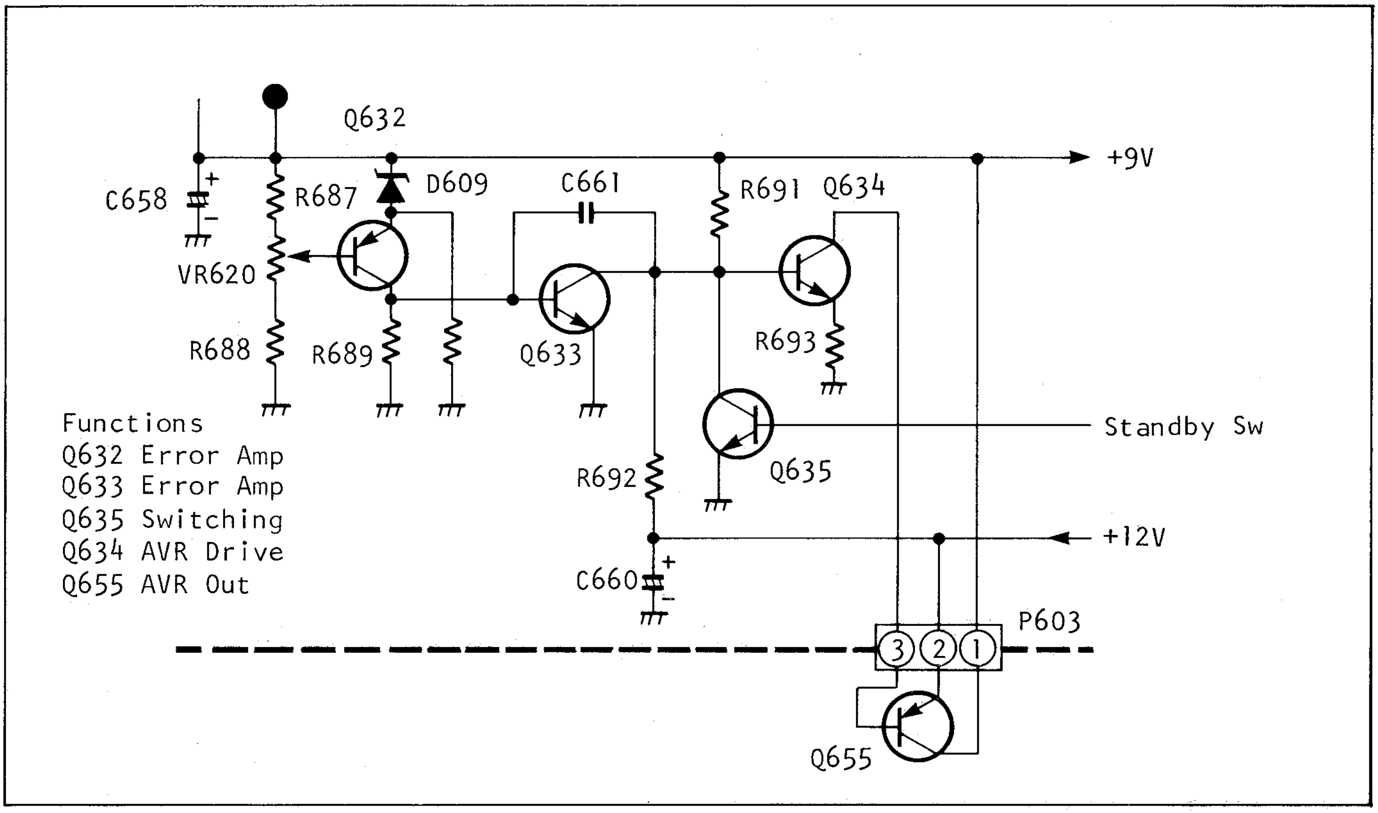

Q632
+9V
C658
R687
D609
C661
R691
Q634
VR620
R688
R689
Q633
R693
Functions
Q632 Error Amp
Q633 Error Amp
Q635 Switching
Q634 AVR Drive
Q655 AVR Out
Standby Sw
R692
Q635
+12V
C660
P603
3
2
1
Q655

Fig. 31. 9 Volt Regulator Circuit

ORDER NO. VRD-8106-876

Service Manual

Color Video Camera

PK-801

Vol. 2

Troubleshooting Guide
Adjustment Procedures

SPECIFICATIONS:

Power Source:	DC 12V ± 10% AC 120V ± 10%, 60Hz ± 0.5% (with Power Supply Unit)
Power Consumption: (with E.V.F)	DC 7.5 W at 12V DC (Battery) DC 0.7 W at Standby
Special Tube System:	2/3″ frequency separation single tube system (built-in stripe filter)
Signal Carrier Frequency:	3.58 MHz
Focus System:	Electro-static type
Lens Mounting:	Built-in zoom lens (not "C" mount)
Lens:	6:1 zoom lens with auto/manual iris control. Auto zoom lens and macro construction F: 1.4, f: 12mm—72mm, d: 1.3m—infinity
Light Sensitivity:	Minimum light intensity on optical image: 50 Lux (F: 1.4) Optimum light intensity on optical image: 900 Lux
Video Output Level:	1.0Vp-p, 75Ω (M type coaxial connector) (Standard NTSC signal)
Sync. System:	Internal Sync: RS-170
Signal to Noise Ratio:	More than 43dB
Horizontal Resolution:	More than 240 lines
Color Temperature Control:	2 step switch (indoor, outdoor) & auto adjust
Microphone:	Condenser Microphone
Audio Output Level:	−20dB, Hi-impedance
Audio Output Impedance:	High impedance (1KΩ)
External Microphone Input Impedance:	600Ω unbalanced
Electronic Viewfinder:	Monochrome 1.5 inch CRT
Operating Temperature:	5°C to 35°C
Operating Humidity:	10% to 75%
Operating Position:	Normal position only
Weight:	Camera Head with E.V.F 6.3 lbs (with lens, 7ft. cable & shoulder pad/handle grip) AC adaptor (option) 2.4 lbs
Demensions:	Camera Head with E.V.F 7″(W) × 8″(H) × 13″(D) 177mm(W) × 210mm(H) × 318mm(D) AC adaptor (option) 3″(W) × 3″(H) × 6″(D) 80mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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Division of Matsushita Electric
Corporation of America
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New Jersey 07094

Panasonic Hawaii, Inc.
320 Waiakamilo Road, Honolulu,
Hawaii 96817

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of Canada Limited
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Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave, 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

PRODUCT COMPLIES WITH DHEW RULES 21CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE

SAFETY PRECAUTION

GENERAL GUIDELINES

1. When service is required, observe the original lead dress. Components, wires or cables that indicate evidence of overheating or other electrical or mechanical damage should be replaced.
2. After servicing the camera, power supply and electronic viewfinder, all the protective devices, such as insulation tape, shields and isolation R-C combinations must be properly installed.
3. Potentials as high as 5KV are present when the electronic viewfinder is operating. Operation without the camera head side covers, finder case ass'ys of electronic viewfinder and covers of power supply unit presents a danger of shock hazard from the camera power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions that should be taken when working on high-voltage equipment. Always discharge the anode of the picture tube to the main chassis before handling the tube.
4. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

Conduct this test on the power supply unit with the camera disconnected and repeat with the camera, power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Turn the AC switch on.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed terminal, screwheads and coaxial connector. The resistance measured should not be less than ∞(infinity). Any resistance value below this range indicates an abnormality which requires corrective action.
3. Repeat the test with the AC switch in the "off" position.

LEAKAGE CURRENT HOT CHECK

Conduct this test on the power supply unit with the camera disconnected and repeat with the camera, power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metallic part on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000Ω/volt or more sensitivity, to measure the potential across the resistor.
4. Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet, Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 V RMS.
   A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks. Leakage current must not exceed 0.5 milliamp.
   In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

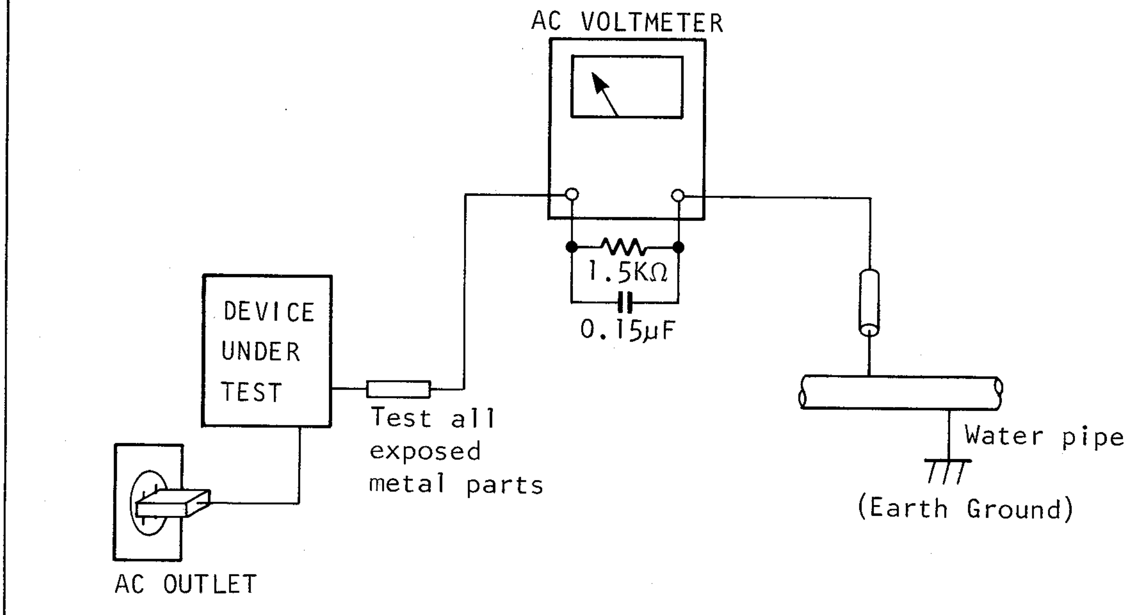
AC VOLTMETER
1.5KΩ
0.15μF
DEVICE UNDER TEST
Test all exposed metal parts
Water pipe
(Earth Ground)
AC OUTLET

Figure 1. Leakage Current Hot Check

X - RADIATION

1. The potential source of x-radiation in electronic view finder is the high - voltage section and picture tube.
2. It is important to use a periodically checked and accurate high-voltage meter, to monitor and check the high voltage.
   Rotate the brightness control and contrast fully counterclockwise for this test.
3. Observe that the high voltage does not exceed the specified value.
   Excessive high voltage may cause a possible x-radiation hazard.
   The camera system should be repaired as soon as possible.
4. It is essential to use the specified picture tube to avoid a possible x-radiation hazard.

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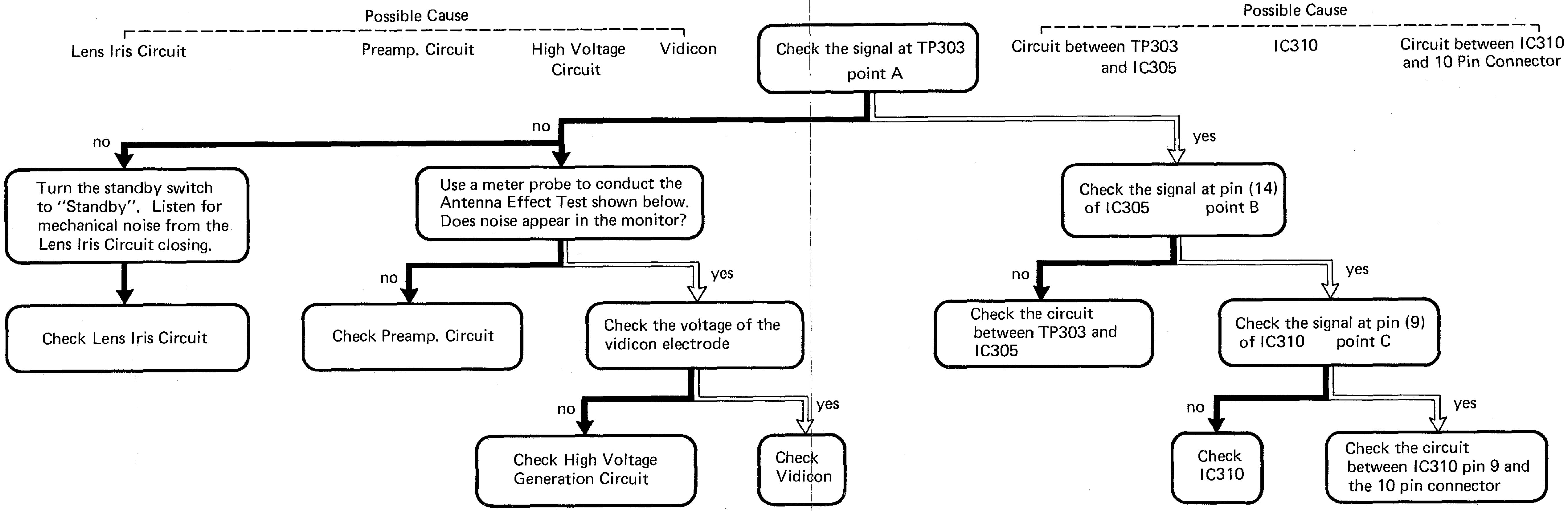
LUMINANCE SECTION

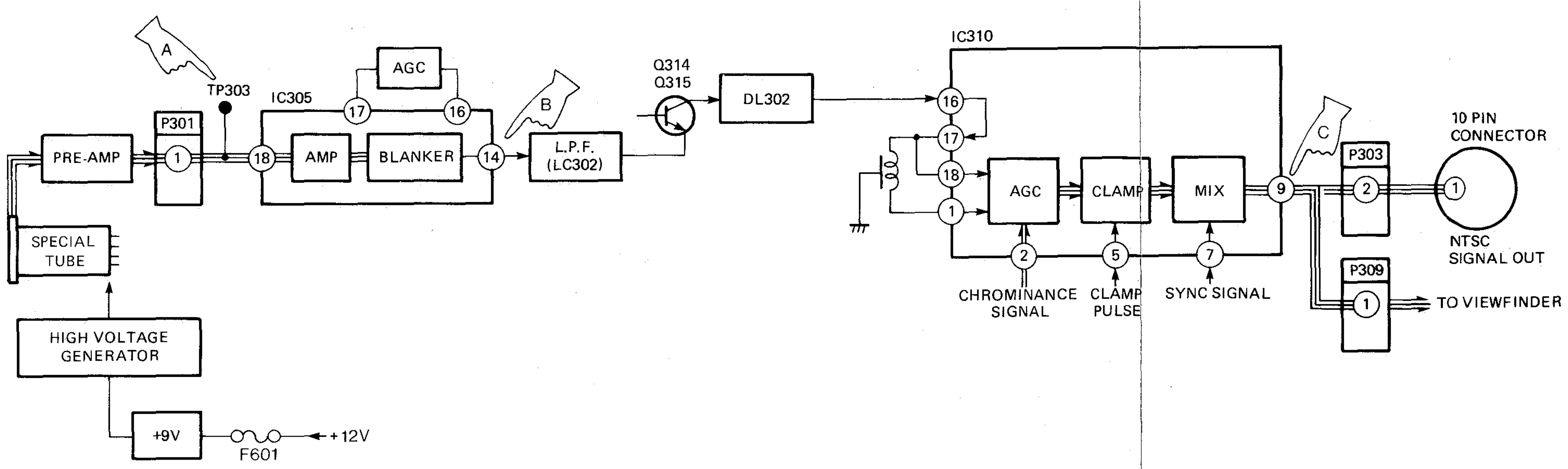
SERVICE FLOW CHART

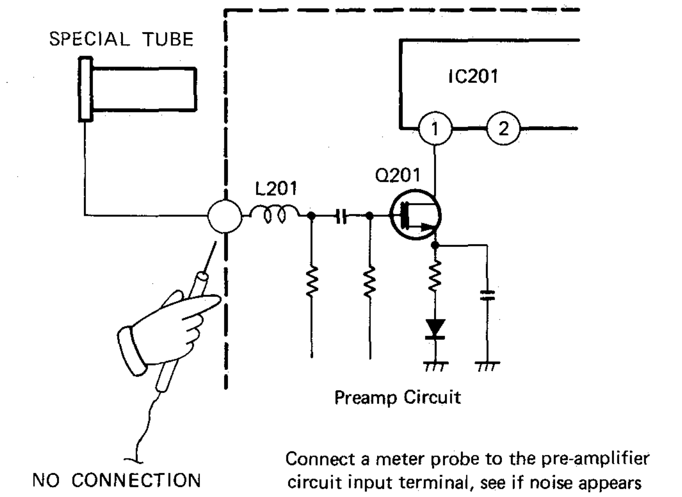
NO PICTURE

If there is no picture, Test Point TP303 is the suggested place to start Checking.
If there is signal at TP303 follow the "Yes" path. If no signal is present, follow the "No" path.


Possible Cause
Lens Iris Circuit
Preamp. Circuit
High Voltage Circuit
Vidicon
Check the signal at TP303 point A
Possible Cause
Circuit between TP303 and IC305
IC310
Circuit between IC310 and 10 Pin Connector
no
no
yes
Turn the standby switch to "Standby". Listen for mechanical noise from the Lens Iris Circuit closing.
Use a meter probe to conduct the Antenna Effect Test shown below. Does noise appear in the monitor?
Check the signal at pin (14) of IC305 point B
no
yes
no
yes
Check Lens Iris Circuit
Check Preamp. Circuit
Check the voltage of the vidicon electrode
Check the circuit between TP303 and IC305
Check the signal at pin (9) of IC310 point C
no
yes
no
yes
Check High Voltage Generation Circuit
Check Vidicon
Check IC310
Check the circuit between IC310 pin 9 and the 10 pin connector

SIGNAL FLOW CHART


A
TP303
P301
IC305
AGC
17
16
B
PRE-AMP
1
18
AMP
BLANKER
14
L.P.F. (LC302)
Q314
Q315
DL302
IC310
16
17
18
1
AGC
CLAMP
MIX
9
C
P303
2
1
10 PIN CONNECTOR
NTSC SIGNAL OUT
P309
1
TO VIEWFINDER
2
5
7
CHROMINANCE SIGNAL
CLAMP PULSE
SYNC SIGNAL
SPECIAL TUBE
HIGH VOLTAGE GENERATOR
+9V
F601
+12V


SPECIAL TUBE
IC201
1
2
L201
Q201
Preamp Circuit
NO CONNECTION

Connect a meter probe to the pre-amplifier circuit input terminal, see if noise appears in the video output (on the monitor).

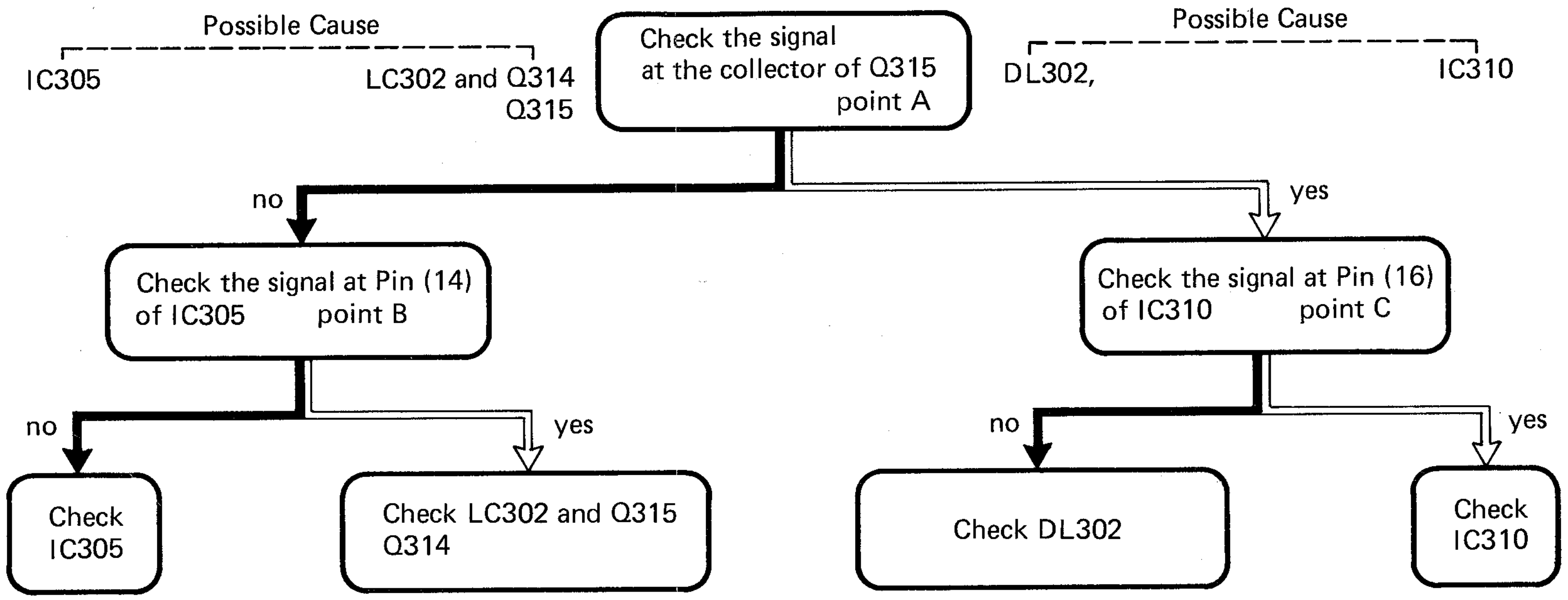
Fig. 1 Antenna Effect Test

LUMINANCE SECTION

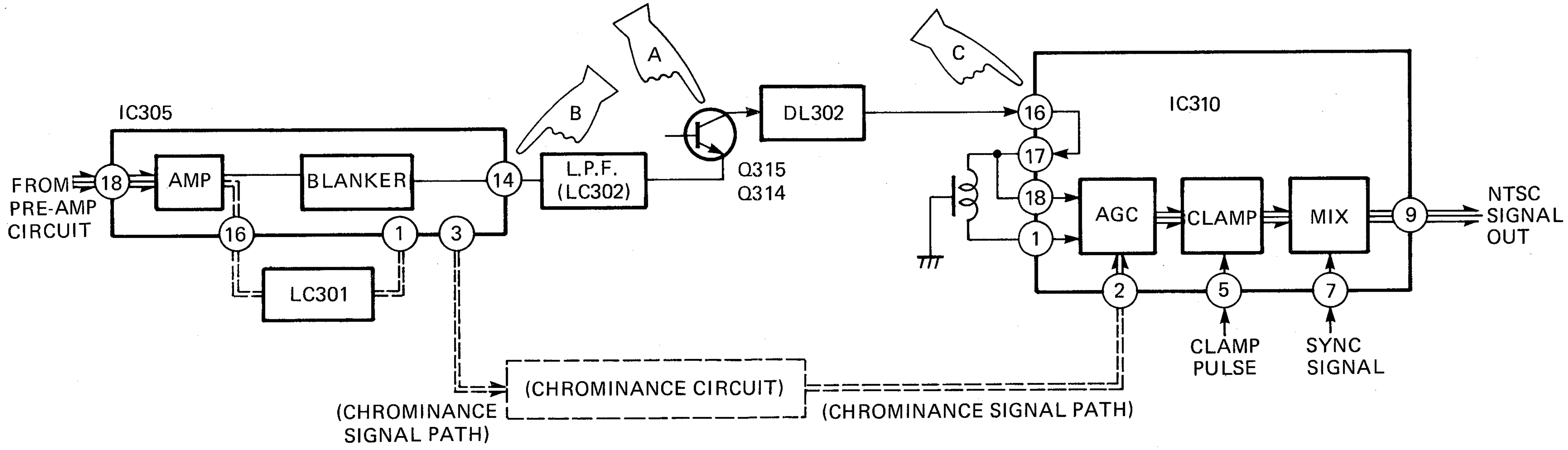
SERVICE FLOW CHART

NO PICTURE (Only Color Signal)

If there is no picture, the collector of Q315 is the suggested place to start checking.
If there is signal at the collector of Q315, follow the "Yes" path.
If no signal is present, follow the "No" path.


Possible Cause
IC305
LC302 and Q314
Q315
Check the signal at the collector of Q315 point A
Possible Cause
DL302,
IC310
no
yes
Check the signal at Pin (14) of IC305 point B
Check the signal at Pin (16) of IC310 point C
no
yes
no
yes
Check IC305
Check LC302 and Q315 Q314
Check DL302
Check IC310

SIGNAL FLOW CHART

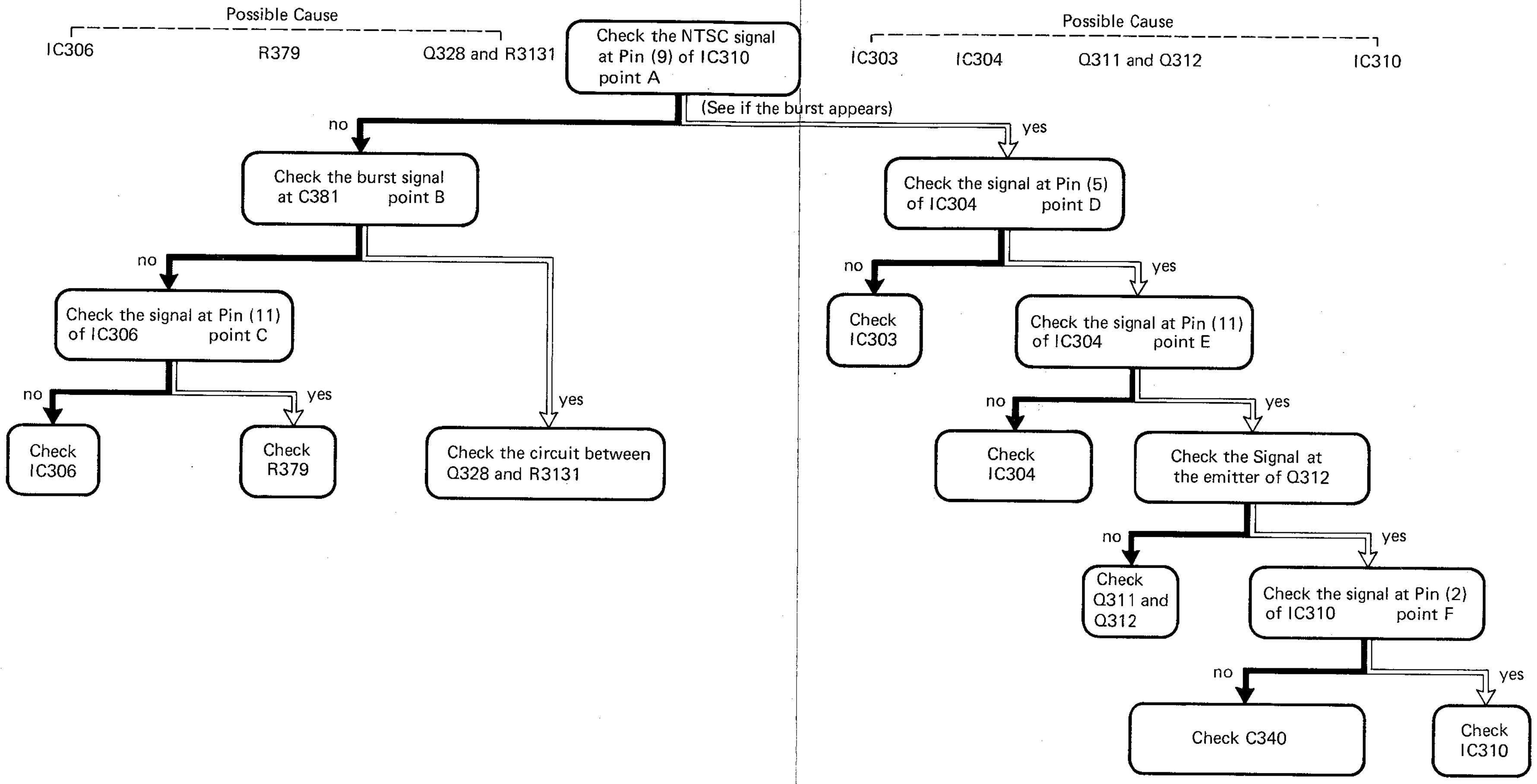

A
B
C
IC305
FROM PRE-AMP CIRCUIT
18
AMP
BLANKER
14
16
1
3
LC301
L.P.F. (LC302)
Q315
Q314
DL302
IC310
16
17
18
1
AGC
CLAMP
MIX
9
2
5
7
CLAMP PULSE
SYNC SIGNAL
NTSC SIGNAL OUT
(CHROMINANCE CIRCUIT)
(CHROMINANCE SIGNAL PATH)
(CHROMINANCE SIGNAL PATH)

CHROMINANCE SECTION

SERVICE FLOW CHART

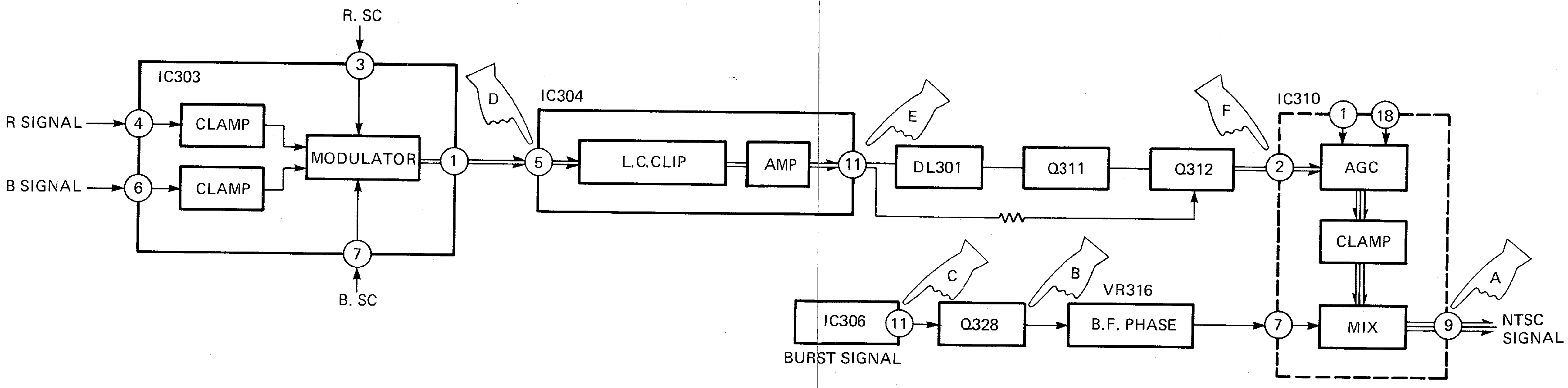
NO COLOR

If there is no color, Pin (9) of IC310 is the suggested place to start checking.
If there is signal at Pin (9) of IC310, follow the "Yes" path.
If no signal is present, follow the "No" path.



Possible Cause
IC306
R379
Q328 and R3131
Check the NTSC signal at Pin (9) of IC310 point A
(See if the burst appears)
Possible Cause
IC303
IC304
Q311 and Q312
IC310
no
yes
Check the burst signal at C381 point B
Check the signal at Pin (5) of IC304 point D
no
yes
Check the signal at Pin (11) of IC306 point C
no
yes
Check IC303
Check the signal at Pin (11) of IC304 point E
no
yes
yes
no
yes
Check IC306
Check R379
Check the circuit between Q328 and R3131
Check IC304
Check the Signal at the emitter of Q312
no
yes
Check Q311 and Q312
Check the signal at Pin (2) of IC310 point F
no
yes
Check C340
Check IC310

SIGNAL FLOW CHART



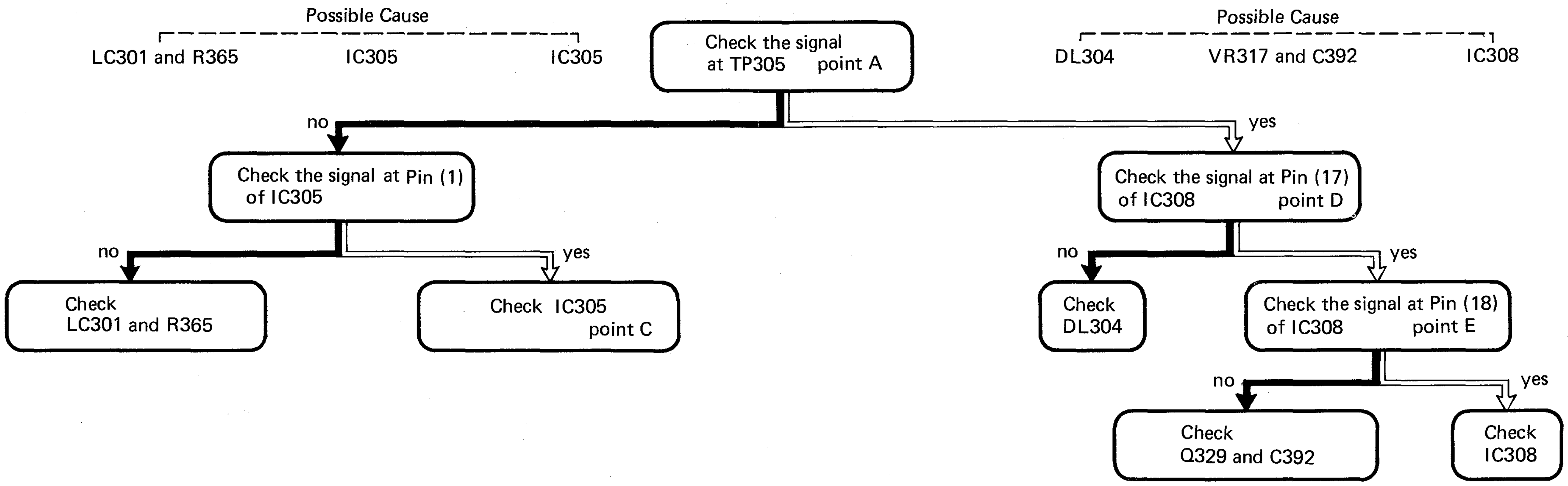
R. SC
IC303
3
R SIGNAL
4
CLAMP
MODULATOR
1
B SIGNAL
6
CLAMP
7
B. SC
D
IC304
5
L.C.CLIP
AMP
11
E
DL301
Q311
Q312
F
IC310
1
18
2
AGC
CLAMP
C
B
VR316
IC306
11
Q328
B.F. PHASE
7
MIX
9
A
NTSC SIGNAL
BURST SIGNAL

CHROMINANCE SECTION

SERVICE FLOW CHART

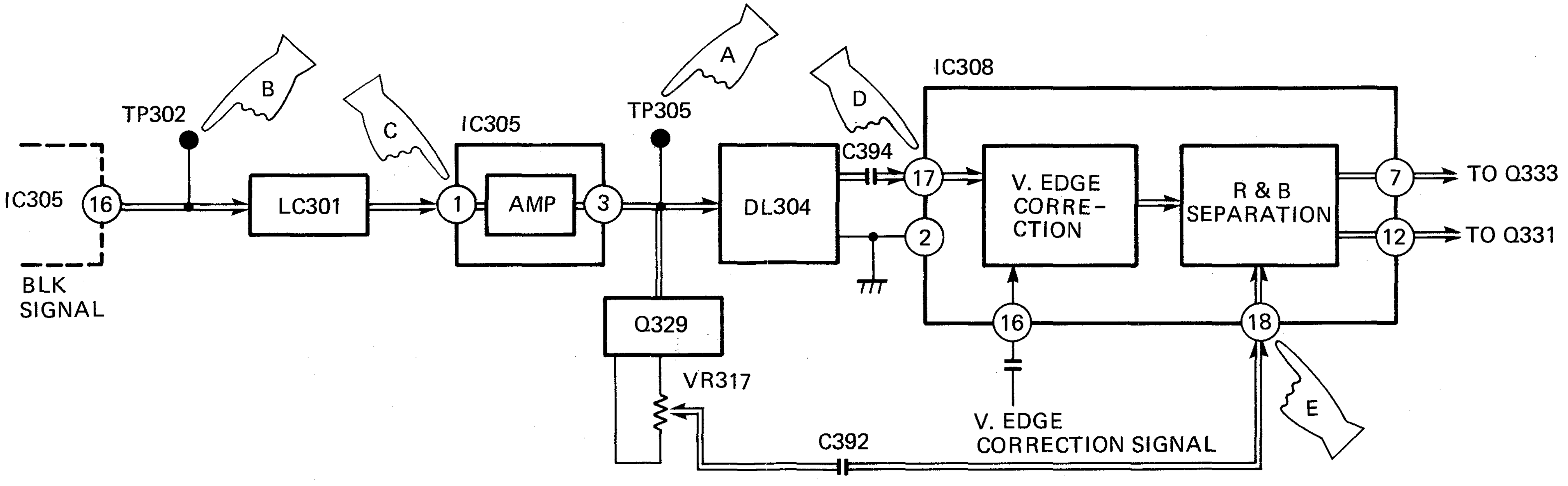
PICTURE TOO GREEN (Little or No Red and Blue)

If there is excessive green, Test Point TP305 is the suggested place to start checking.
If the signal is correct at TP305, follow the "Yes" path.
If the signal is not proper, follow the "No" path.


Possible Cause
LC301 and R365
IC305
IC305
Check the signal at TP305 point A
Possible Cause
DL304
VR317 and C392
IC308
no
yes
Check the signal at Pin (1) of IC305
Check the signal at Pin (17) of IC308 point D
no
yes
Check LC301 and R365
Check IC305 point C
no
yes
Check DL304
Check the signal at Pin (18) of IC308 point E
no
yes
Check Q329 and C392
Check IC308

Note: Before troubleshooting extensively, remember that focus, dynamic focus, beam alignment, gain and B gain all affect the amount and flatness of the red and blue signals, also YL pedestal (VR307) affect the YL signal amount. Therefore, those adjustments make the picture have a green tint or green areas. Please check them if it seem to be misadjustment rather that component failure. Refer to the service manual adjustment procedure.

SIGNAL FLOW CHART

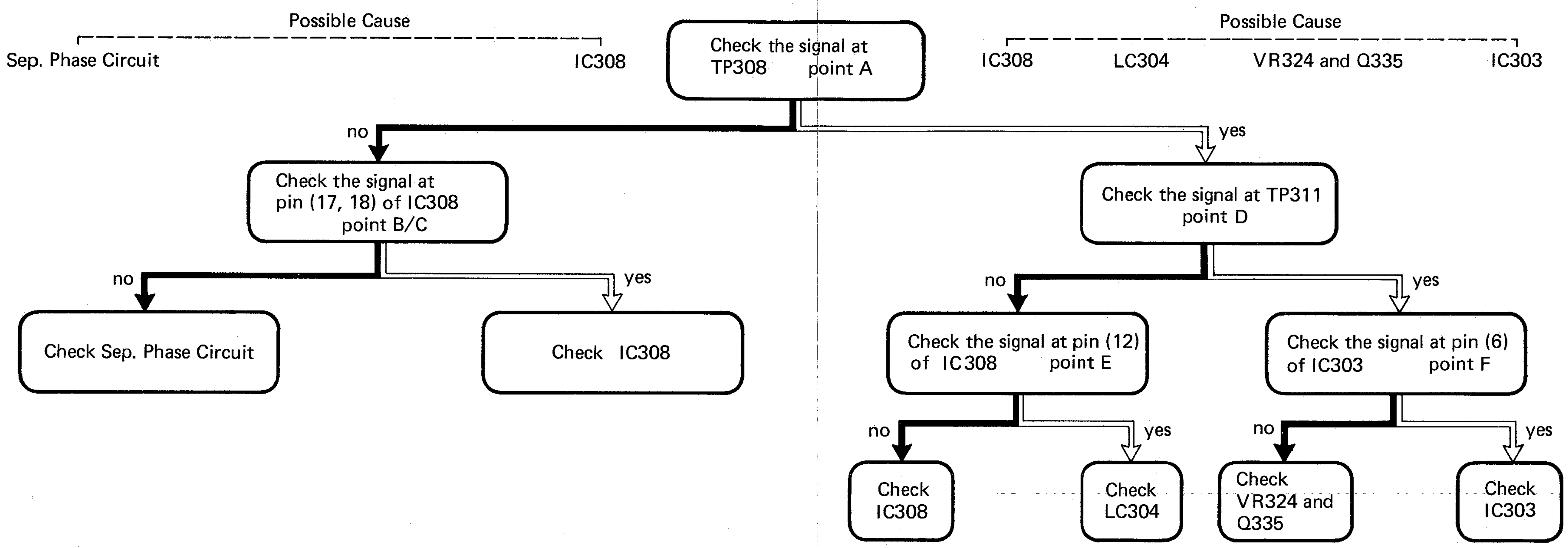

B
C
A
D
IC308
TP302
IC305
TP305
C394
IC305
16
LC301
1
AMP
3
DL304
17
2
V. EDGE CORRE-CTION
R & B SEPARATION
7
12
TO Q333
TO Q331
BLK SIGNAL
Q329
16
18
VR317
E
C392
V. EDGE CORRECTION SIGNAL

CHROMINANCE SECTION

SERVICE FLOW CHART

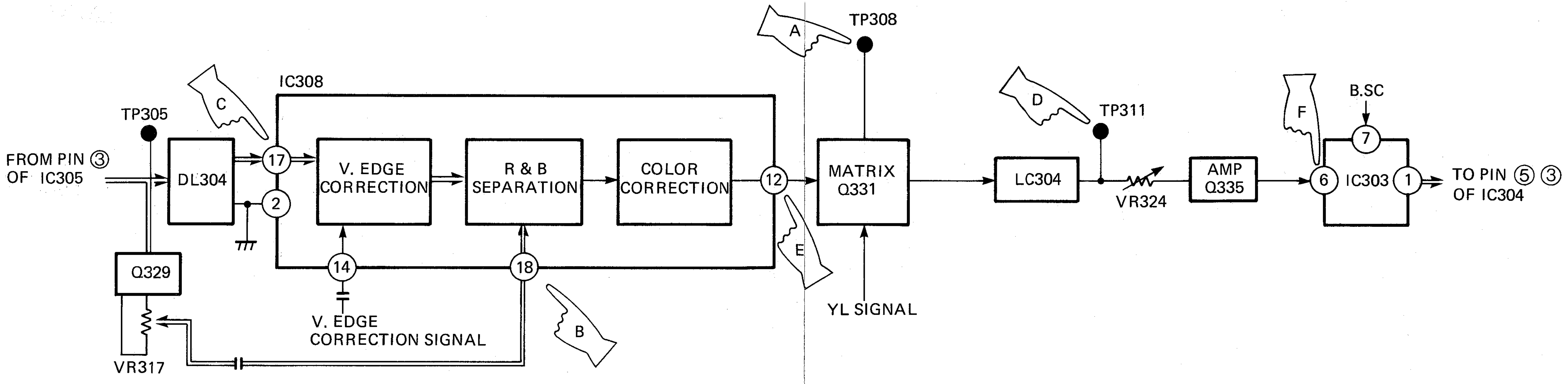
BLUE CHANNEL DEFECTIVE (Too Much/Too Little Red)

If there is insufficient or excessive Blue, Test Point TP308 is the suggested place to start checking.
If the signal is correct at TP308, follow the "Yes" path.
If the signal is not proper, follow the "No" path.



Possible Cause
Sep. Phase Circuit
IC308
Check the signal at TP308 point A
Possible Cause
IC308
LC304
VR324 and Q335
IC303
no
yes
Check the signal at pin (17, 18) of IC308 point B/C
Check the signal at TP311 point D
no
yes
Check Sep. Phase Circuit
Check IC308
no
yes
Check the signal at pin (12) of IC308 point E
Check the signal at pin (6) of IC303 point F
no
yes
no
yes
Check IC308
Check LC304
Check VR324 and Q335
Check IC303

SIGNAL FLOW CHART



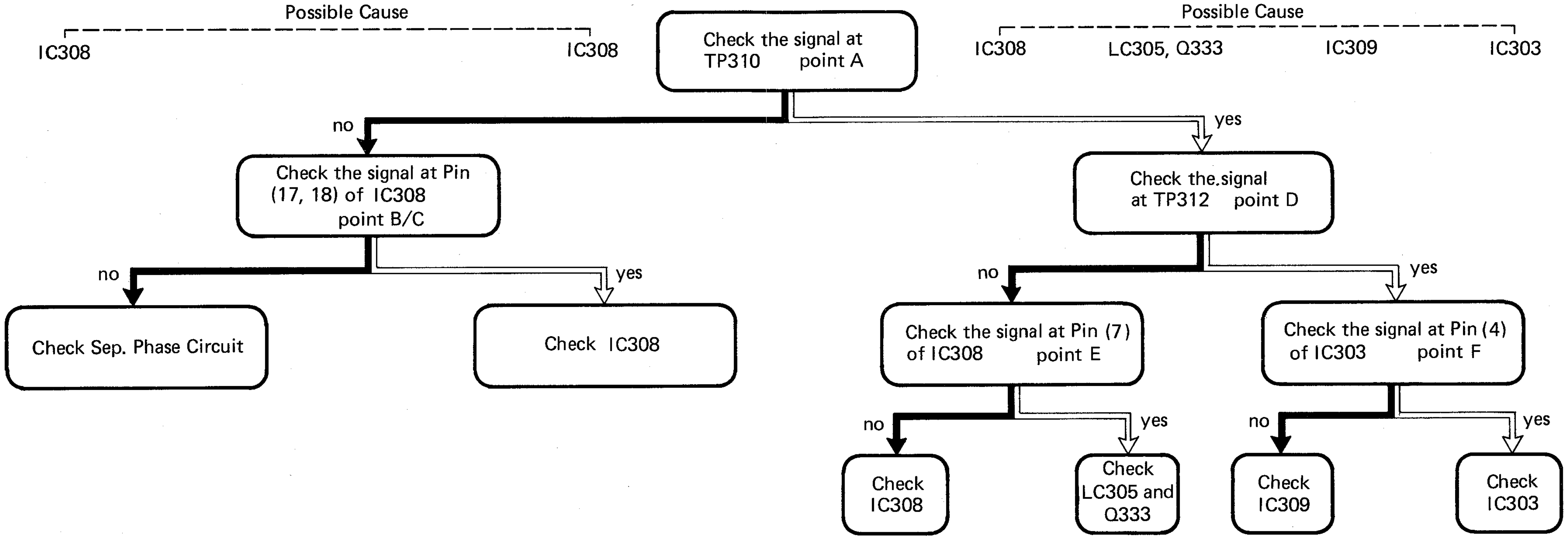
A
TP308
C
IC308
TP305
D
TP311
F
B.SC
FROM PIN ③ OF IC305
DL304
17
2
V. EDGE CORRECTION
R & B SEPARATION
COLOR CORRECTION
12
MATRIX Q331
LC304
VR324
AMP Q335
6
7
IC303
1
TO PIN ⑤ ③ OF IC304
E
14
18
Q329
V. EDGE CORRECTION SIGNAL
YL SIGNAL
B
VR317

CHROMINANCE SECTION

SERVICE FLOW CHART

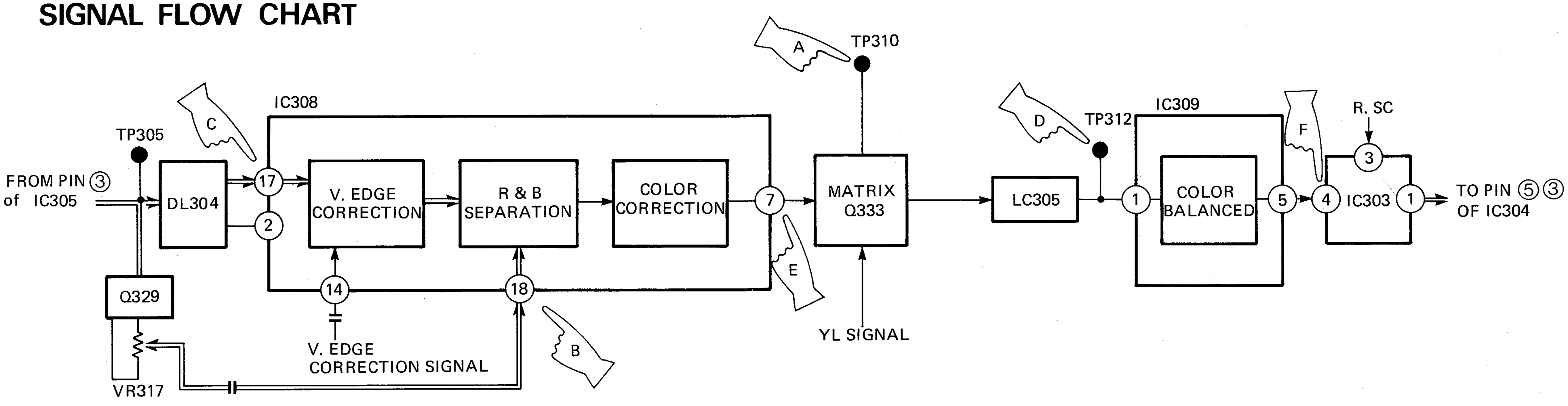
RED CHANNEL DEFECTIVE (Too Much/Too Little Blue)

If there is insufficient or excessive red, Test Point TP310 is the suggested place to start checking.
If the signal is correct at TP310, follow the "Yes" path.
If the signal is not proper, follow the "No" path.



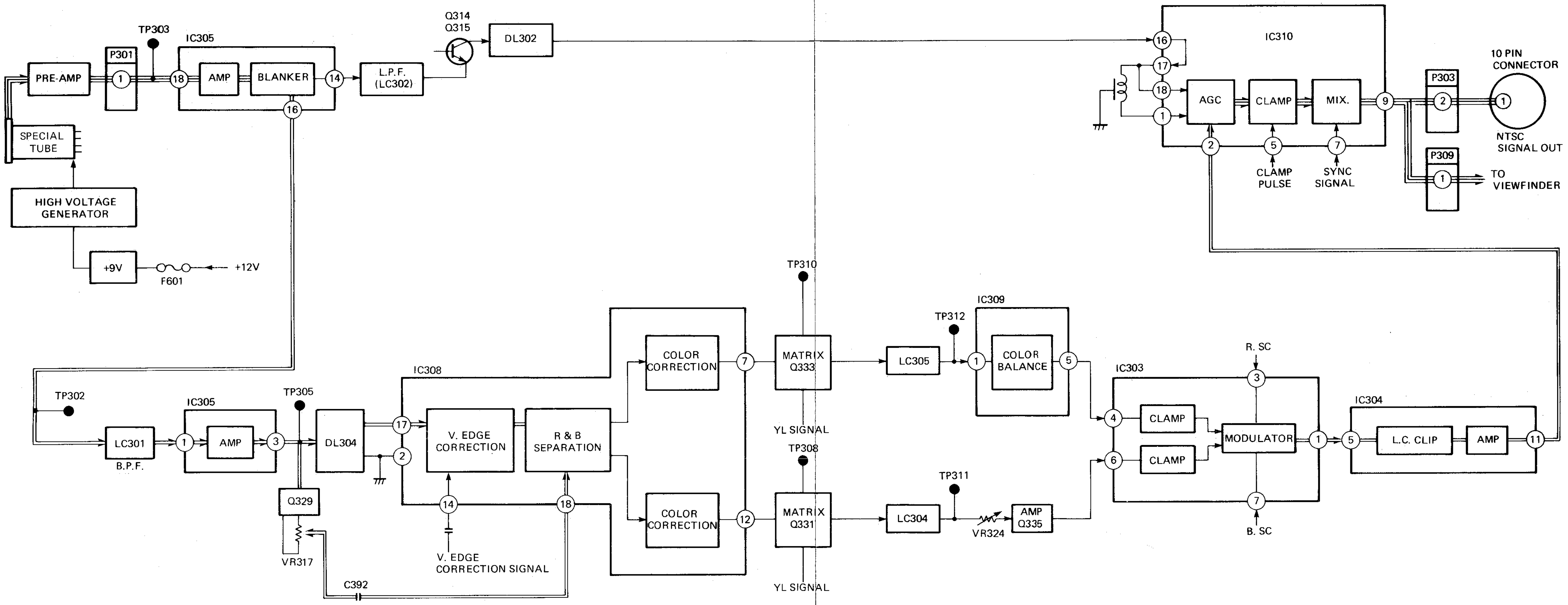
Possible Cause
IC308
IC308
Check the signal at TP310 point A
Possible Cause
IC308
LC305, Q333
IC309
IC303
no
yes
Check the signal at Pin (17, 18) of IC308 point B/C
Check the.signal at TP312 point D
no
yes
no
yes
Check Sep. Phase Circuit
Check IC308
Check the signal at Pin (7) of IC308 point E
Check the signal at Pin (4) of IC303 point F
no
yes
no
yes
Check IC308
Check LC305 and Q333
Check IC309
Check IC303

SIGNAL FLOW CHART



A
TP310
C
IC308
D
TP312
IC309
F
R. SC
TP305
FROM PIN ③ of IC305
DL304
17
2
V. EDGE CORRECTION
R & B SEPARATION
COLOR CORRECTION
7
MATRIX Q333
LC305
1
COLOR BALANCED
5
4
IC303
1
3
TO PIN ⑤③ OF IC304
E
14
18
Q329
VR317
V. EDGE CORRECTION SIGNAL
B
YL SIGNAL

SIMPLIFIED OVERALL FLOW CHART


TP303
IC305
P301
PRE-AMP
AMP
BLANKER
L.P.F.
(LC302)
Q314
Q315
DL302
IC310
AGC
CLAMP
MIX.
CLAMP PULSE
SYNC SIGNAL
10 PIN CONNECTOR
P303
NTSC SIGNAL OUT
P309
TO VIEWFINDER
SPECIAL TUBE
HIGH VOLTAGE GENERATOR
+9V
F601
+12V
TP310
TP312
IC309
COLOR BALANCE
LC305
MATRIX Q333
YL SIGNAL
TP308
MATRIX Q331
YL SIGNAL
LC304
TP311
VR324
AMP Q335
R. SC
B. SC
IC303
CLAMP
CLAMP
MODULATOR
IC304
L.C. CLIP
AMP
IC308
COLOR CORRECTION
COLOR CORRECTION
V. EDGE CORRECTION
R & B SEPARATION
V. EDGE CORRECTION SIGNAL
TP302
TP305
LC301
B.P.F.
IC305
AMP
DL304
Q329
VR317
C392

TROUBLESHOOTING FOR ELECTRONIC VIEWFINDER CIRCUIT

Item	Symptom	Cause	Troubleshooting
1	One horizontal raster	Failure of the vertical deflection circuit.	Check → D902 → Q905 → IC901 Pin 5 → Deflection coil
2	No both vertical and horizontal synchronization	Failure of the sync separation circuit.	Check → input video signal → Q903
3	No vertical synchronization.	•Failure of the integrate circuit. •Failure of the vertical oscillation circuit.	Check Integrate circuit R925, C914 → Q905
4	No horizontal synchronization.	•Failure of the AFC circuit. •Failure of the horizontal oscillation circuit.	Check → D903 , D904 → D905 , D906 , D907
5	Vertical return scanning is appeared.	Failure of the elimination circuit for return scanning.	Check → D901 → Q904
6	No raster	•Failure of the high voltage circuit. •Failure of the horizontal deflection circuit. •Failure of brightness control circuit.	Check → D907 → D908 → G3 voltage G2 voltage G1 voltage → Q906 → Q907 → Q908 → Adjust VR904 for brightness control.
7	No picture , but raster appears.	Failure of the video amplifier circuit.	Check → Q901 , Q902
8	No indicator	Failure of the indicator circuit.	Check → D911 , D910

ABBREVIATIONS USED IN THIS MANUAL

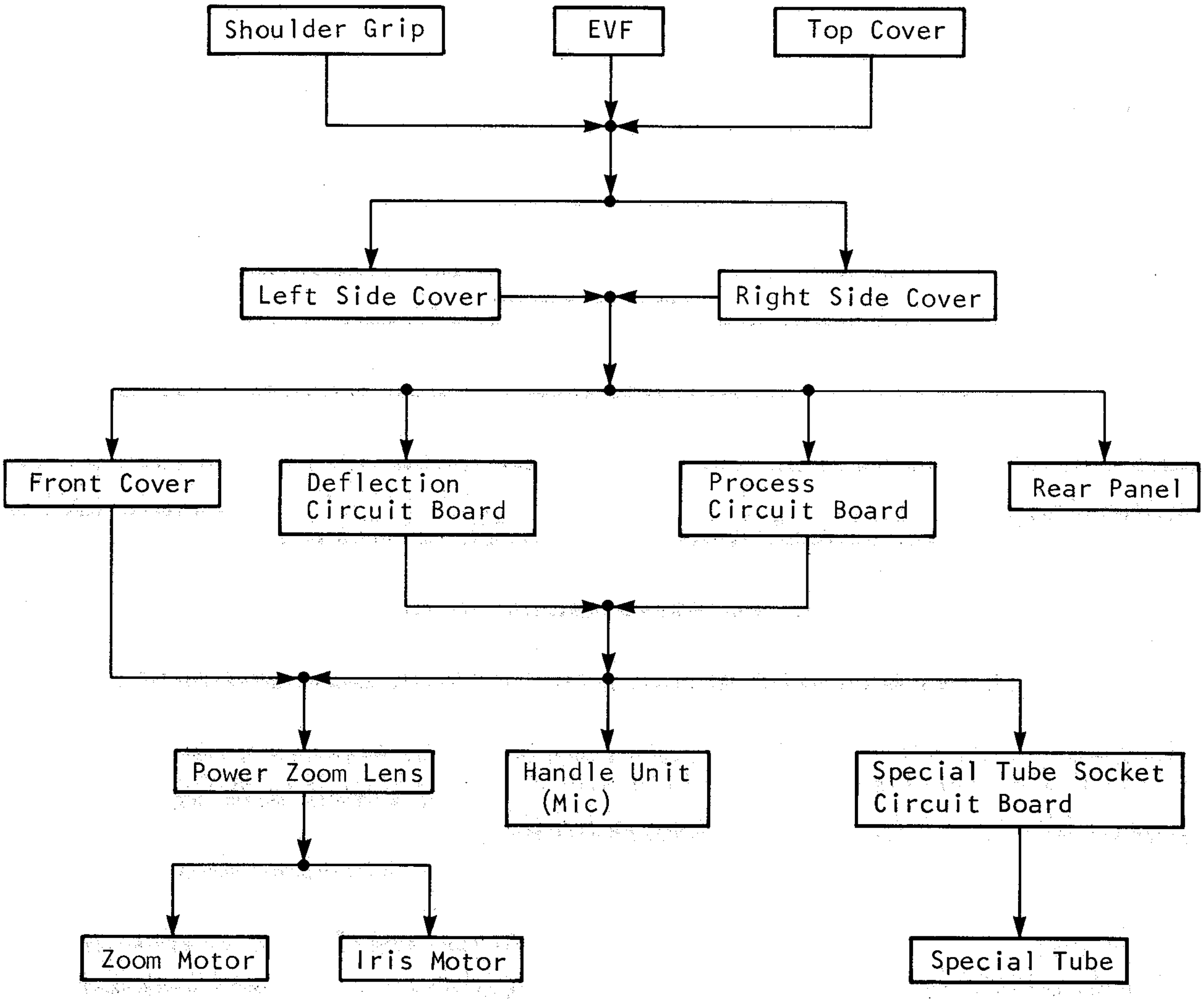
ADJ	Adjustment
Adj.	Adjustment
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AMP.	Amplifier
AWC	Automatic white Balance Control
B	Blue
BAL	Balance
B.F.P.	Burst Flag Pulse
BLK	Blanking
BPF	Band Pass Filter
BSC	Blue Sub Carrier
C	Close
CB	Composite Blanking
CBA	Circuit Board Assembly.
CP-1	Clamping Pulse 1
CP-2	Clamping Pulse 2
CRT	Cathode Ray Tube
CS	Composite Sync
DEF	Deflection
DET	Detector
DIFF AMP	Differential Amplifier
DL	Delay Line
DY	Deflection Yoke
ELIM	Elimination
EVF	Electronic View Finder
FBT	Fly Back Transformer
FET	Field Effect Transistor
FH	15.75 KHz Horizontal Drive Pulse Frequency
G	Green
GB	Gated Burst Signal
GEN	Generator
H	Horizontal
HCC	High Chrominance Clip
HD	Horizontal Drive Pulse
Hd	Horizontal Drive Pulse (Delayed HD)
HP	Horizontal Parabola Waveform
Hs	Horizontal Saw-tooth Waveform
HSS	Horizontal Scanning Start Pulse
LCC	Low Chrominance Clip
LIN	Linearity
LPF	Low Pass Filter
LVL	Level
MOD	Modulation
OB	Optical Black
OSC	Osillator
OVF	Optical View Finder
PCB	Printed Circuit Board
PED	Pedestal
R	Red
REMO. CON.	Remote Control
RSC	Red Sub Carrier
SC1	0° Phase Sub Carrier
SC2	90° Phase Sub Carrier
SD	Shading Correction
SEPA.	Separation
TEMP.	Temperature
V	Vertical
VD	Vertical Drive Pulse
VP	Vertical Parabola Waveform
VS	Vertical Saw-tooth Waveform
VSS	Vertical Scanning Start Pulse
WBLK	Wide Blanking Pulse
YE	Edge Correction Input Signal
YH	Luminance Signal
YL	Low Band Luminance Signal

ADJUSTMENT PROCEDURES

Disassembly Method

Caution: Camera Service must be performed in a dust free location to maintain clean lens elements.

1. DISASSEMBLY FLOW CHART


Shoulder Grip
EVF
Top Cover
Left Side Cover
Right Side Cover
Front Cover
Deflection Circuit Board
Process Circuit Board
Rear Panel
Power Zoom Lens
Handle Unit (Mic)
Special Tube Socket Circuit Board
Zoom Motor
Iris Motor
Special Tube

2. DETAILED DISASSEMBLY METHOD

2-1. Removal of Shoulder Grip
Unscrew 2 screws (A) and remove the shoulder grip (see Fig.1).

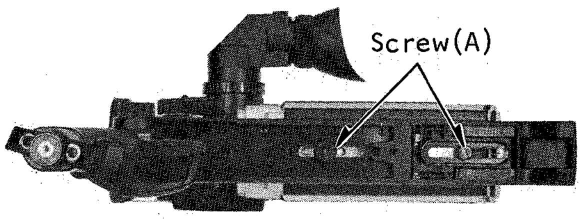


Fig.1 Bottom View

2-2. Removal of E.V.F Unit
Turn the handle knob (A), pull out the EVF cord and remove the EVF unit (see Fig.2).

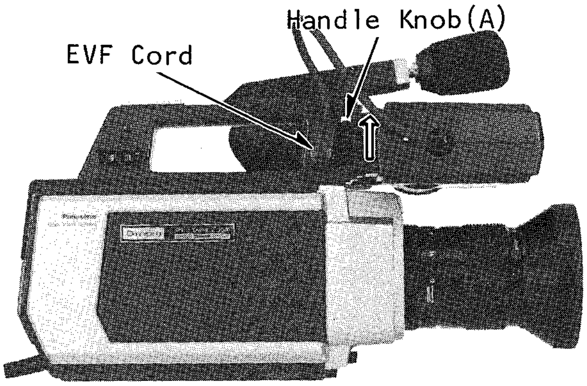

Handle Knob(A)
EVF Cord

Fig.2 Left Side Cover

2-3. Removal of Top Cover
Turn the handle knob (B), unscrew 2 screws (B) and remove the top cover (see Fig.3).

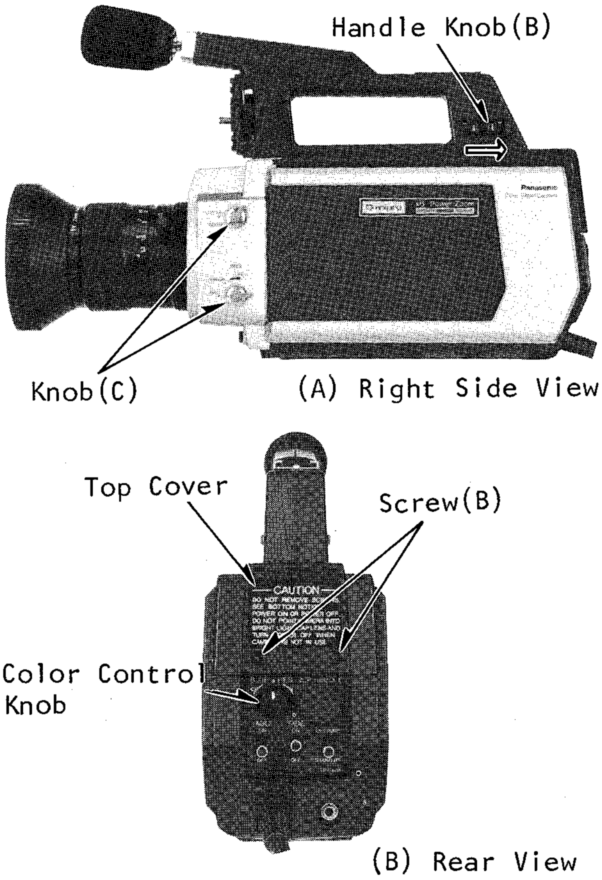

Handle Knob(B)
Knob(C)
(A) Right Side View
Top Cover
Screw(B)
Color Control Knob
(B) Rear View

Fig.3

2-4. Pull off the color control knob (see Fig.3-B).

2-5. Pull off 2 knobs (C) (see Fig.3-A).

2-6. Removal of Right Side Cover
Unscrew 2 screws (C) and remove the right side cover (see Fig.4).

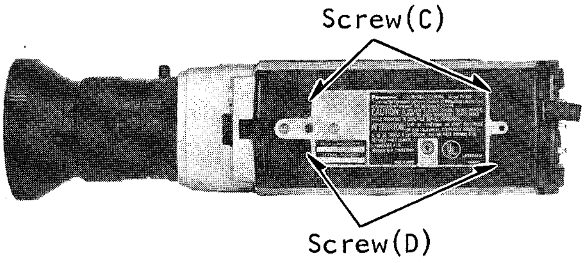

Screw(C)
Screw(D)

Fig.4 Bottom View

2-7. Removal of Left Side Cover
Unscrew 2 screws (D) and remove the left side cover (see Fig. 4).

2-8. Removal of Front Cover
a. Unscrew 3 screws (E) and disconnect a connector P623 (see Fig.5).

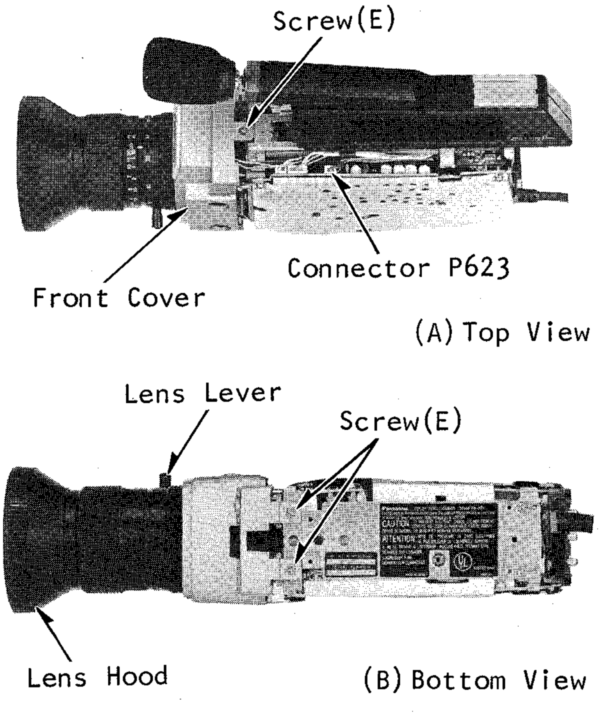

Screw(E)
Connector P623
Front Cover
(A) Top View
Lens Lever
Screw(E)
Lens Hood
(B) Bottom View

Fig.5

b. Unscrew the lens lever and remove the lens hood (see Fig.5).

c. Remove the front cover ass'y.

2-9. Opening of Deflection Circuit Board
Unscrew 2 screws (F) securing the circuit board to the chassis (see Fig.6).

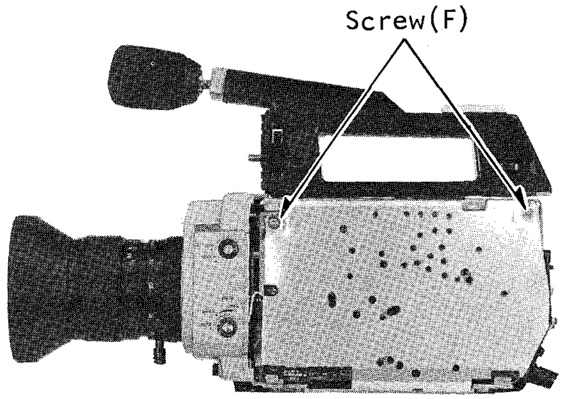


Fig.6 Right Side View

2-10. Opening of Process Circuit Board
Unscrew 2 screws (G) securing the circuit board to the chassis (see Fig.7).

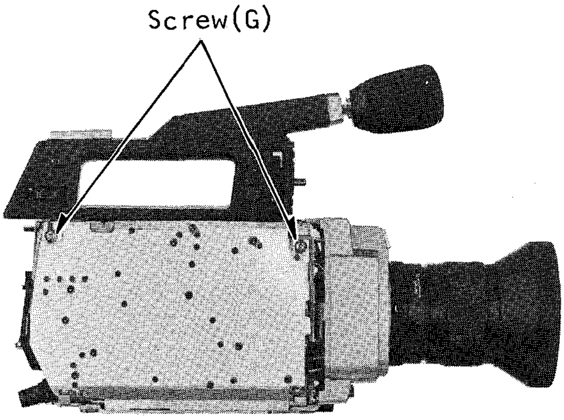


Fig.7 Left Side View

2-11. Removal of Handle Unit
Disconnect 4 connectors (P611, P616, P309 and P503) and remove the handle unit (see Fig.8).

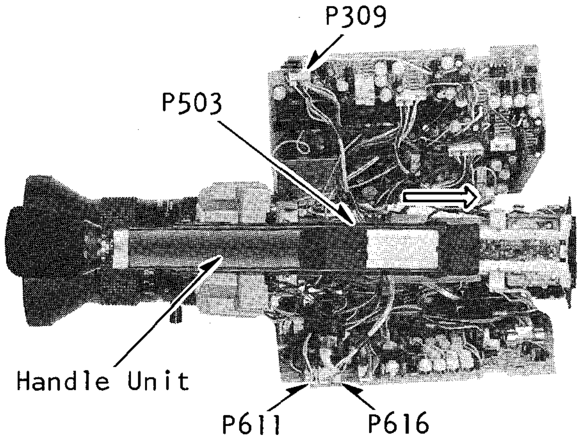

P309
P503
Handle Unit
P611
P616

Fig.8 Top View

3. REPLACEMENT OF THE SPECIAL TUBE

3-1. Remove both side covers and open the process circuit and deflection circuit boards. (Refer to section "Disassembly Method".)

3-2. Disconnect 2 connectors (P611 and P616) (see Fig.9).

3-3. Unscrew 2 screws (A) and 2 screws (B) (see Fig.9).

3-4. Unsolder and remove a ground lead and a capacitor (A) from the deflection yoke assembly (see Fig.9).

3-5. Unsolder and remove the target shield cover (see Fig.9).

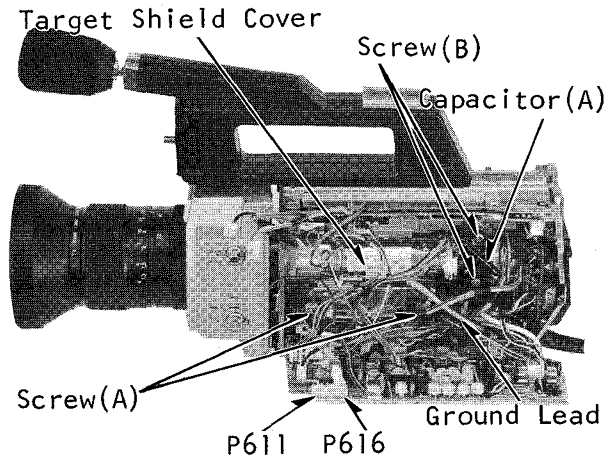

Target Shield Cover
Screw(B)
Capacitor(A)
Screw(A)
Ground Lead
P611
P616

Fig.9 Right Side View

3-6. Unsolder and remove a white lead from the preamp. circuit board (see Fig.10).

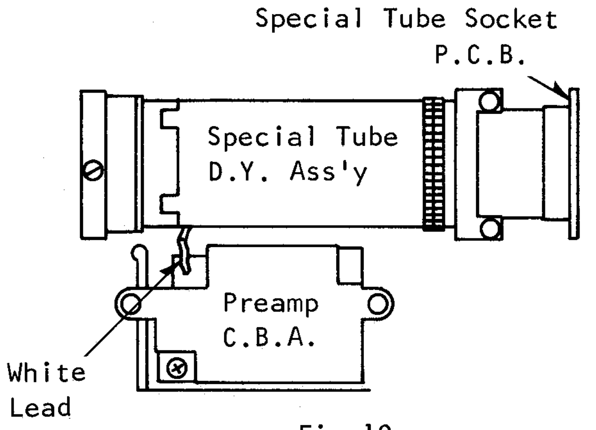

Special Tube Socket P.C.B.
Special Tube D.Y. Ass'y
Preamp C.B.A.
White Lead

Fig.10

3-7. Remove the special tube socket circuit board from the special tube.

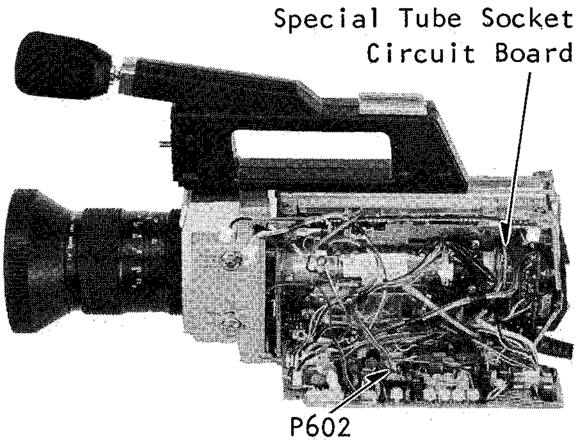

Special Tube Socket Circuit Board
P602

Fig.11 Right Side View

3-8. Disconnect 2 connectors (P602 and P627) and remove the special tube D.Y. assembly with the target shield cover (see Fig.11 and Fig.12).

3-9. Remove the filter fixture assembly and the D.Y. holder (A)/(B) (see Fig.12).

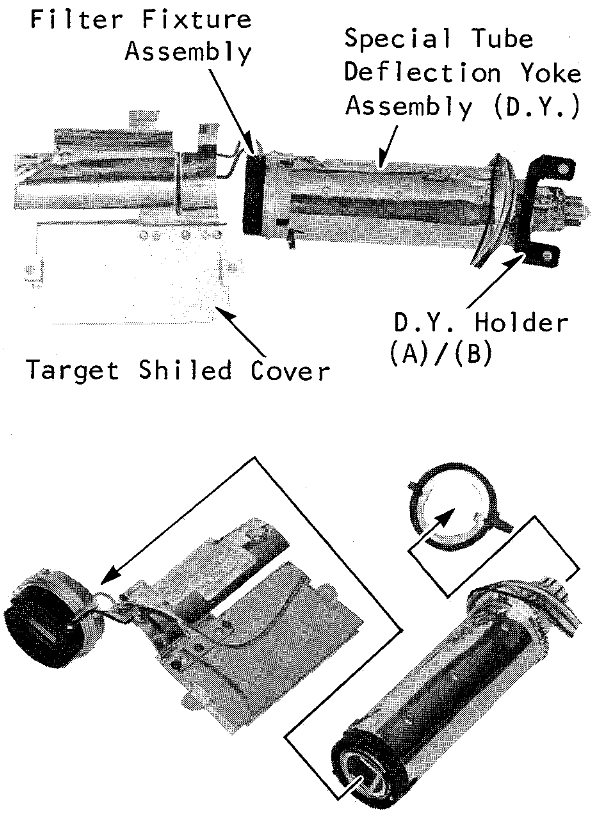

Filter Fixture Assembly
Special Tube Deflection Yoke Assembly (D.Y.)
D.Y. Holder (A)/(B)
Target Shiled Cover

Fig.12 Special Tube D.Y. Assembly

3-10. Loosen the clamp screw and remove the special tube from the deflection yoke assembly (D.Y.) (see Fig.13).

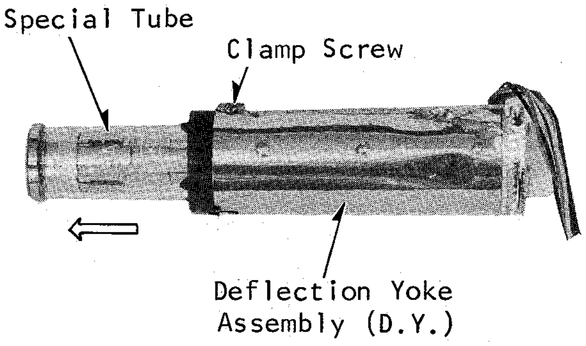

Special Tube
Clamp Screw
Deflection Yoke Assembly (D.Y.)

Fig. 13 Special Tube and D.Y.

3-11. Install the new special tube (K9373) in the deflection yoke assembly as shown in Fig.14.

Note: Make sure tube's faceplate is clean before reinstalling. To install tube, reverse the previous steps.

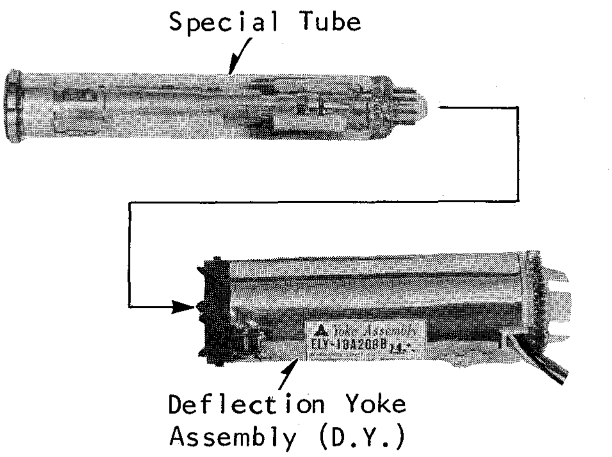

Special Tube
Yoke Assembly
ELY-18A208B
Deflection Yoke Assembly (D.Y.)

Fig.14 Special Tube and D.Y.

3-12. Line up the plastic tab on the D.Y. assembly with the silver line on the face of the special tube. The optical black shape (silver "U") should be upside down as shown in Fig.15.

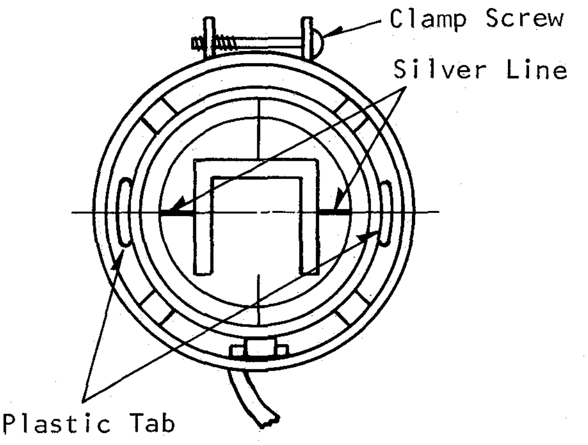

Clamp Screw
Silver Line
Plastic Tab

Fig.15.

3-13. Push the special tube in the D.Y. assembly as far as it will go ... using lens cleaning tissue paper to keep the faceplate spotless (see Fig.16).

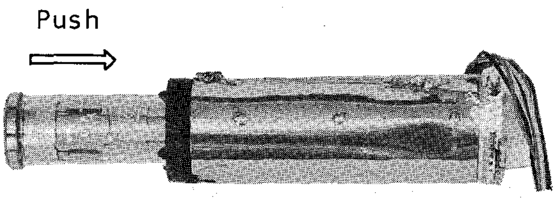
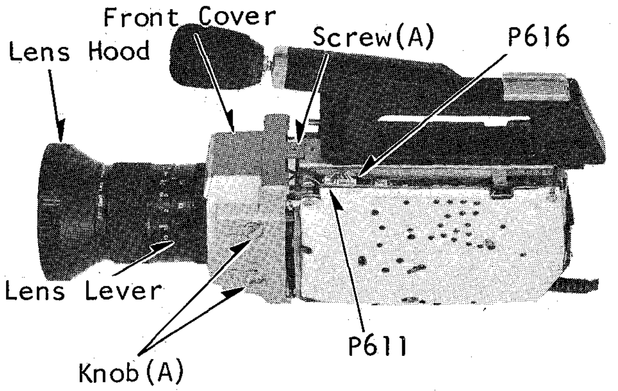


Fig. 16

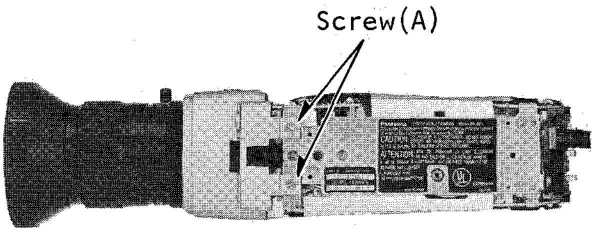
4. REPLACEMENT OF THE POWER ZOOM LENS

4-1. Remove the both side covers. (Refer to section "Disassembly Method".)

4-2. Unscrew 3 screws (A) and pull off 2 knobs (A).


Front Cover
Lens Hood
Screw(A)
P616
Lens Lever
P611
Knob(A)

(A) Right Side View



(B) Bottom View

Fig.17

4-3. Unscrew the lens lever and remove the lens hood (see Fig.17).

4-4. Disconnect a connector (P623) and remove the front cover (see Fig.17).

4-5. Open the process circuit board and the deflection circuit board. (Refer to section "Disassembly Method".)

4-6. Disconnect 4 connectors (P309, P503, P611 and P616) and remove the handle unit (see Fig.17-A and Fig.18).

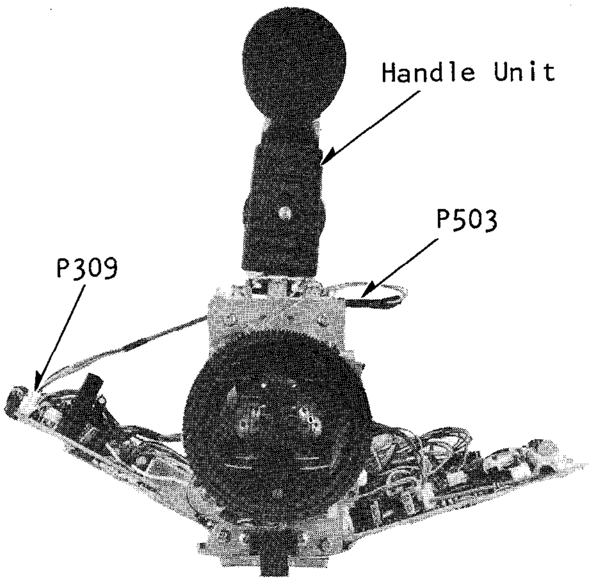
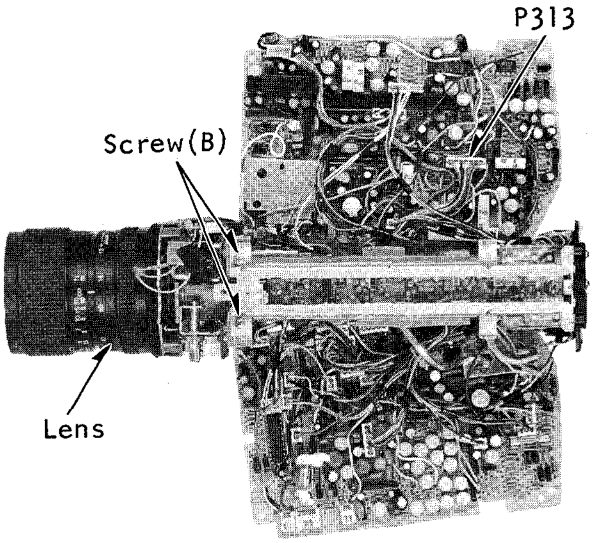


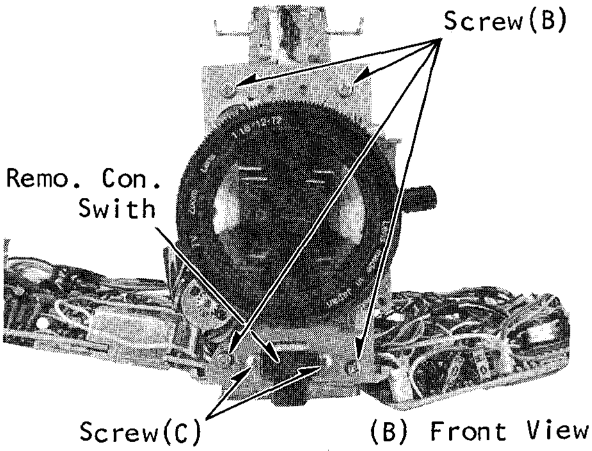
Fig.18 Front View

4-7. Disconnect a connector P313 from the process circuit board (see Fig.19-A).

4-8. Unscrew 6 screws (B) and remove the lens assembly.



(A) Top View



(B) Front View

Fig.19

4-9. Unscrew 2 screws (C) and remove the remo. con. switch (see Fig.19-B).

4-10. Install the new zoom lens ... using lens cleaning tissue paper to keep the lens spotless.

5. REPLACEMENT OF ZOOM MOTOR

5-1. Remove the power zoom lens. (Refer to section "Replacement of the power zoom lens".)

5-2. Unscrew 2 screws (A) and remove the zoom motor (see Fig.20).

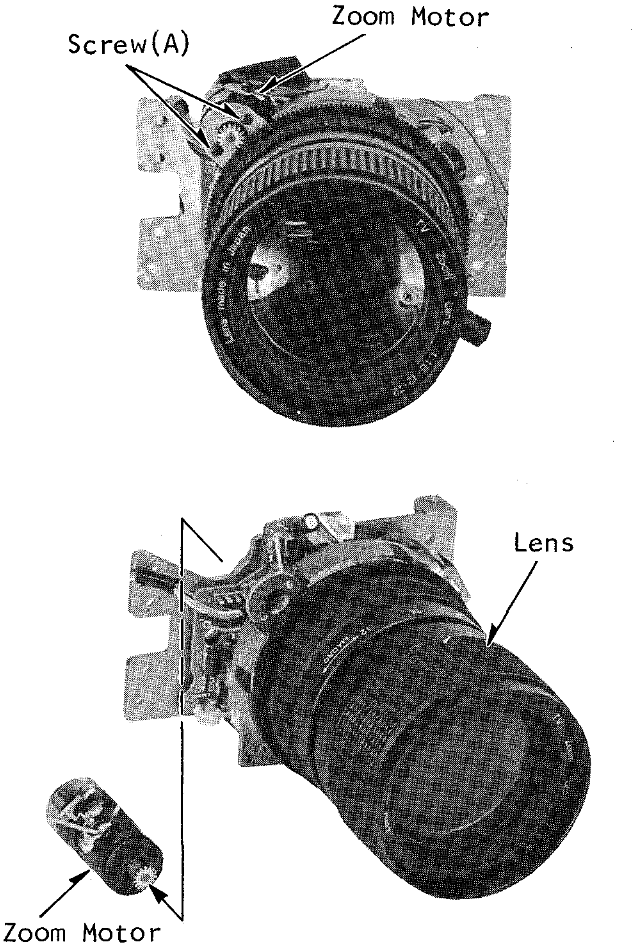

Zoom Motor
Screw(A)
Lens
Zoom Motor

Fig.20

5-3. Install the new zoom motor.

5-4. Before assembling the power zoom lens to the chassis, confirm that there are no spots on the lens surface.

6. REPLACEMENT OF IRIS MOTOR ASSEMBLY

6-1. Remove the power zoom lens. (Refer to section "Replacement of the power zoom lens".)

6-2. Unscrew 3 screws (A) and remove the lens from the chassis (see Fig.21).

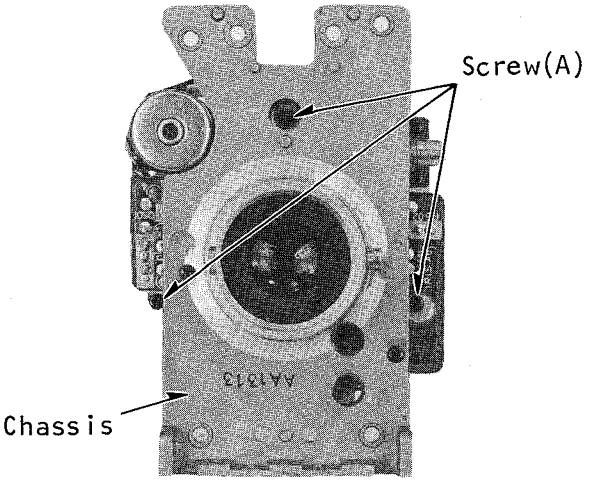

Screw(A)
Chassis

Fig.21

6-3. Unscrew 3 screws (B) and remove the iris motor assembly (see Fig.22).

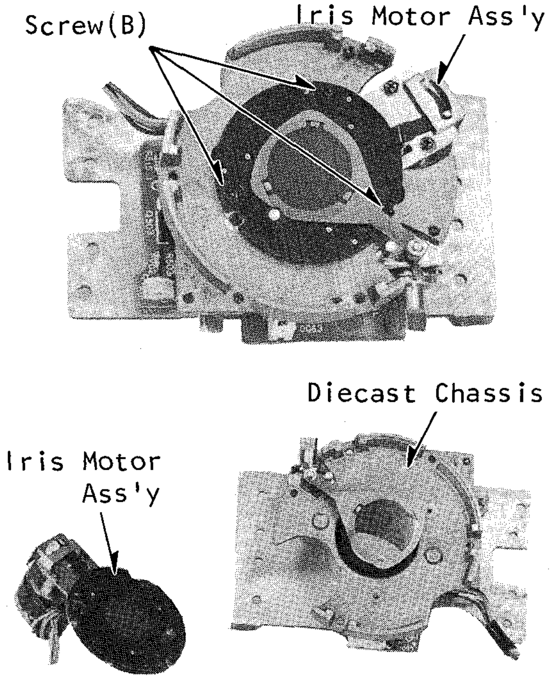

Screw(B)
Iris Motor Ass'y
Diecast Chassis
Iris Motor Ass'y

Fig.22

6-4. Install the new iris motor assembly ... before assembling the iris motor assembly to the diecast chassis, confirm that there are no spots on the lens surface and iris motor assembly.

MEMO

TEST EQUIPMENT LIST

1. Light Box w/Chart

	Part Number
Light Box w/Chart Set ------	VFKS002
Grayscale Chart ------	VFKS002A
Color Chart ------	VFKS002B
Registration Chart ------	VFKS002C
Resolution Chart ------	VFKS002D
Light Box ------	VFKS002Y

Reflection Chart

	Part Number
Reflection Chart Set ------	VFKS003
Grayscale Chart ------	VFKS003A
Color Chart ------	VFKS003B
Registration Chart ------	VFKS003C
Resolution Chart ------	VFKS003D
Color Sheet ------	VFKS003E

2. 3200°K Studio light (See your local photo supply dealer).
   Minimum requirement is 2 flood lights about 350-500 watts each.

3. Luxmeter
   We recommend one of the following:
   A. Portable luxmeter Model No. 3281 by Yokogawa
      Yokogawa Corporation of America
      2 Dart Road Shenandoah, GA 30265

   B. Electronic Foot Candle Meter by Panlux
      Berkey Marketing Company
      25-30 Brooklyn Queens Expressway Woodside,
      New York 11377

4. FM Detector (*)
   Part No. -------- VFKS001

5. Under Scanned Color Monitor

6. Oscilloscope
   Dual Trace, 25mHz, 2mV/DIV.
   Minimum Sensitivity with Delay Mode.

7. Vector Scope

8. Signal Generator
   Sinewave 10 - 30 Hz

9. Video Sweep Generator

10. VTVM or Digital Voltmeter

11. Tripod

12. Frequency Counter

(*) ----- Available from panasonic Regional Division.

Electrical Adjustment Procedures

Preparations:
It is recommended to adjust the color camera after 30 minutes of warm up for optimum adjustments.

[1] +9V ADJUSTMENT

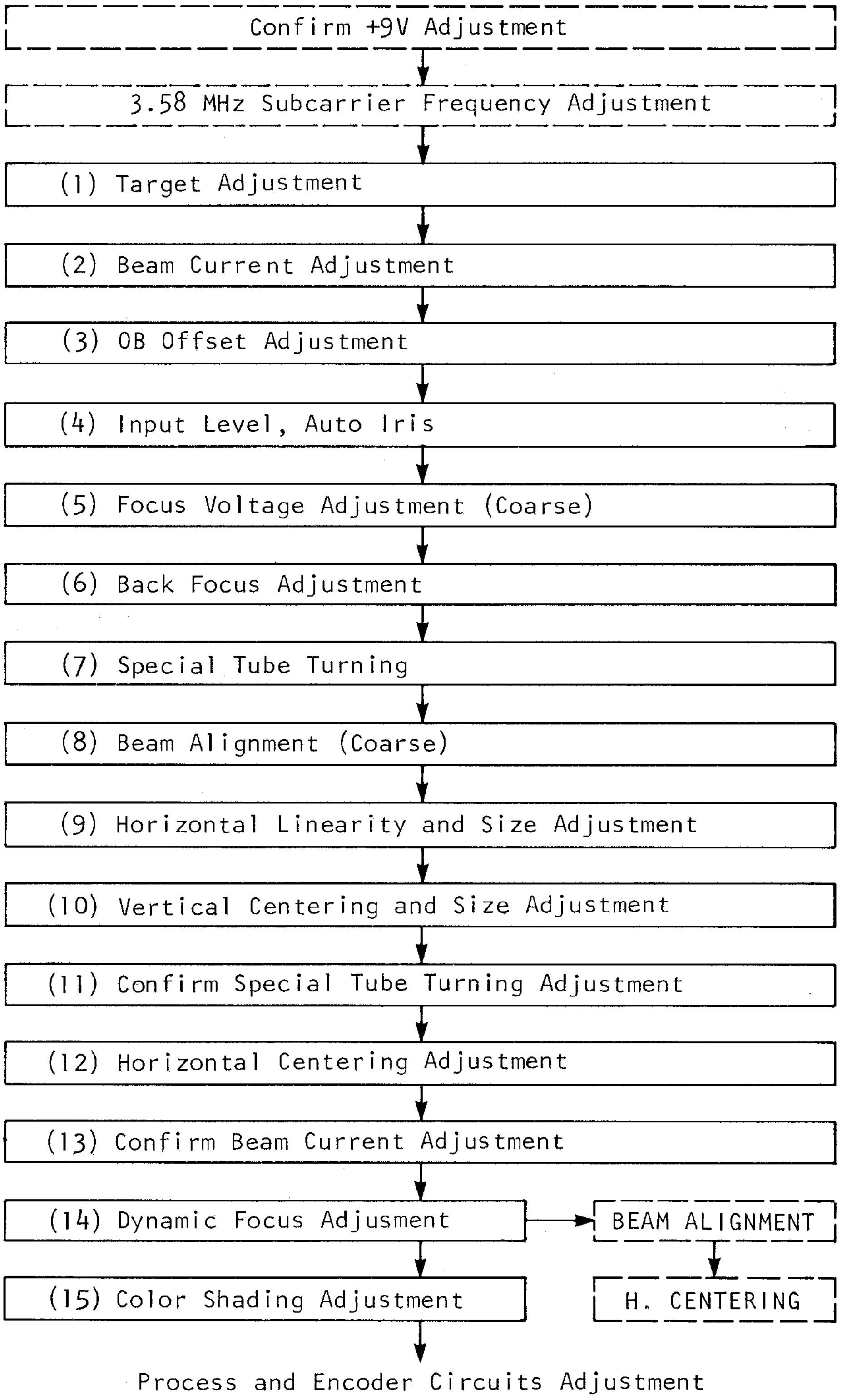
CAUTIONS:
Adjust +9V voltage before proceeding with the other camera adjustments. Do not adjust later in the procedure as it will affect overall adjustment.

If entire camera alignment is not to be performed, do not adjust +9V voltage unless the error is more than ±0.02 volt.

1. Observe the voltage at the +9V regulator at TP612 (Deflection Board) with a voltmeter, and adjust the voltage to +9V ±0.01 Volts with VR620.
2. If the +9V was misadjusted more than 0.5V, repeat Step 2 after 5 minutes.

[2] DEFLECTION CIRCUIT ADJUSTMENT

ADJUSTMENT FLOW CHART OF DEFLECTION CIRCUIT (BOARD)


Confirm +9V Adjustment
3.58 MHz Subcarrier Frequency Adjustment
(1) Target Adjustment
(2) Beam Current Adjustment
(3) OB Offset Adjustment
(4) Input Level, Auto Iris
(5) Focus Voltage Adjustment (Coarse)
(6) Back Focus Adjustment
(7) Special Tube Turning
(8) Beam Alignment (Coarse)
(9) Horizontal Linearity and Size Adjustment
(10) Vertical Centering and Size Adjustment
(11) Confirm Special Tube Turning Adjustment
(12) Horizontal Centering Adjustment
(13) Confirm Beam Current Adjustment
(14) Dynamic Focus Adjusment
BEAM ALIGNMENT
H. CENTERING
(15) Color Shading Adjustment
Process and Encoder Circuits Adjustment

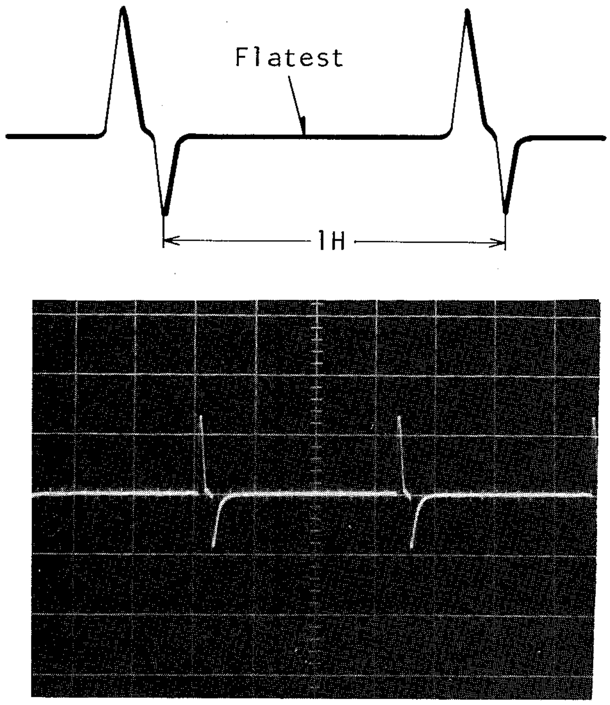
Preparation:

1. Preset the following:
   - a) Color Control Knob (White Balance) .....Center position (Detent position)
   - b) Auto/Manual Iris Control SW ....."Manual (close)" position
   - c) Color Temperature Correction SW ....."Indoor" position
   - d) AGC SW ..... "ON" position
   - e) Standby SW ..... "Operate" position

2. Release the Dynamic Focus

Note: It's best to external trigger from TP608 for horizontal adjustments and TP605 for vertical adjustments flatest response.

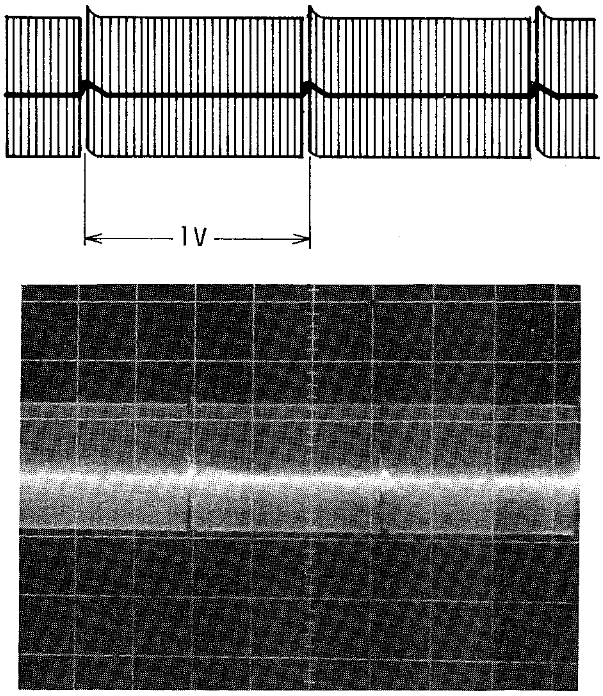
(a) Set iris control to close and observe the signal at H. rate at TP604 and adjust VR608 (H. Saw) and VR609 (H. Par) for the signal waveform to be flatest during horizontal period as shown in Fig. 1.



1V 20µsec

Fig.1

(b) Observe the signal at V. rate at TP604 and adjust VR610 and VR611 for the signal waveform to be flatest during vertical period as shown in Fig. 2.

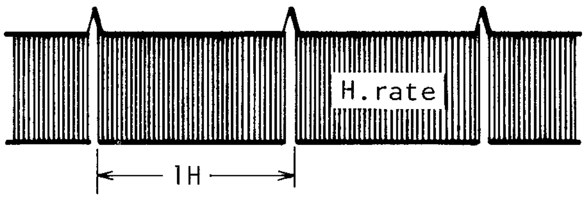


1V 5msec

Fig.2

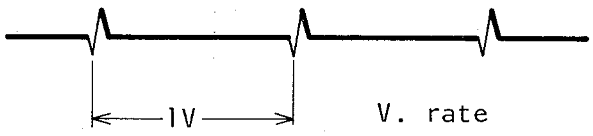
3. Release the color shading

(a) Observe the signal at H. rate TP606 and adjust VR612 and VR613 for the signal waveform to be faltest during horizontal period as shown in Fig. 3.



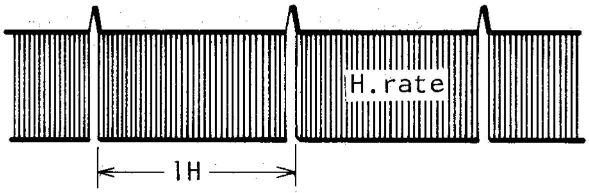
0.1V 20µsec Fig.3

(b) Observe the signal at V. rate at TP606 and adjust VR624 and VR627 for the signal waveform to be flatest during vertical period as shown in Fig. 4.



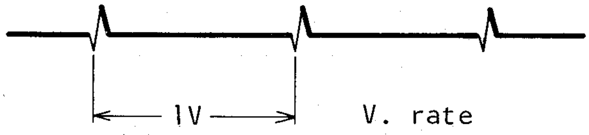
0.1V 5msec Fig.4

(c) Observe the signal at H. rate at TP607 and adjust VR614 and VR615 for the signal waveform to be flatest during horizontal period as shown in Fig. 5.



0.1V 20µsec Fig.5

(d) Observe the signal at V. rate at TP607 and adjust VR625 and VR626 for the signal waveform to be flatest during vertical period as shown in Fig. 6.



0.1V 5msec Fig.6

4. Adjust the 3.58 MHz sub-carrier frequency.

TP	Adj.	Chart	Test Instrument	Scope Trigger
Pin (7) of IC303 Sub-carrier	C357	/	Frequency Counter	/

(a) Measure the sub-carrier frequency with frequency counter.
(b) Adjust C357 for 3,579, 545 ± 50 Hz.

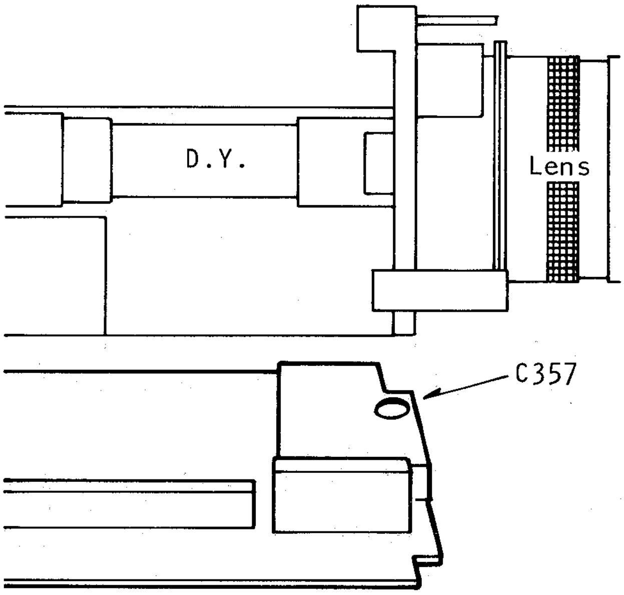


Fig.7

(1) TARGET ADJUSTMENT

TP	Adj	Chart	Test Instrument	Scope Trigger
TP601	VR601 Target Control	/	Voltmeter	/

Note: Before making any adjustments, you must wait 5 minutes after closing the lens to allow the dark current to stabilize.

1. Set iris control to close (manual) and observe the voltage at TP601 (deflection C.B.A.) with a voltmeter.
2. Adjust VR601 (Target) for 55VDC.
3. Set iris control to auto.

(2) BEAM CURRENT ADJUSTMENT

Note: Set Auto/Manual Iris Conrol to "Auto".

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP303	VR605	White Light Box	Scope	TP605 Vss

1. Connect the scope probe to TP303 and observe the signal at V. rate.

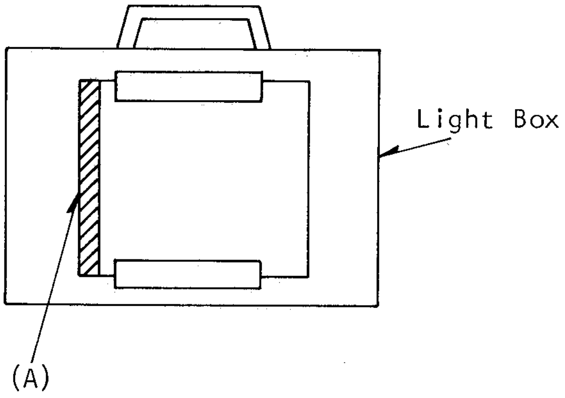


Fig.8

2. Aim camera at (A) portion of the light box Fig. 8 (or some other small light source) to make the beam saturated (waveform does not increase).
3. Adjust VR605 (Beam) for signal clipping at 1.8 Vp-p. If the signal is less than 1.8 Vp-p, use a more intense light. Watch out for special tube burn!! (See Fig. 9.).

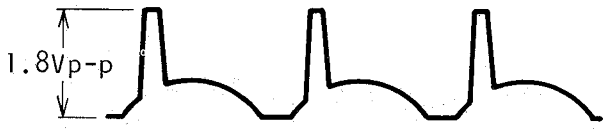


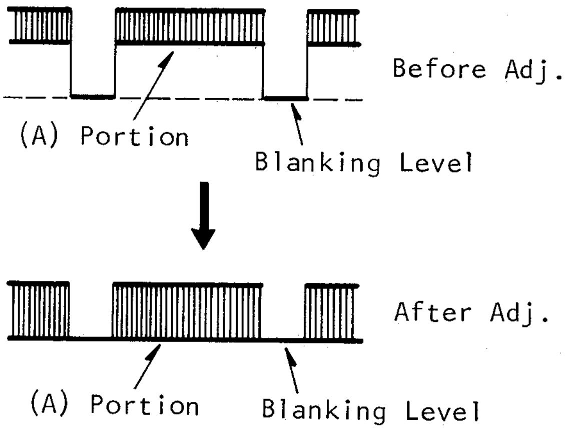
Fig.9

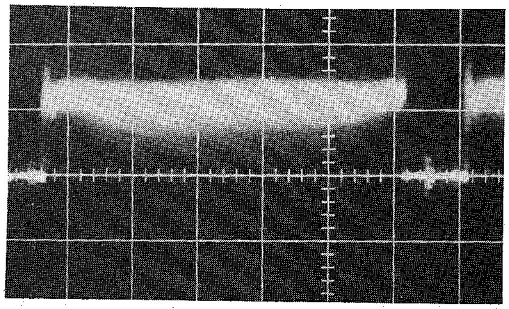
(3) OPTICAL BLACK OFFSET ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP304	VR306	/	Scope	TP608 Hss

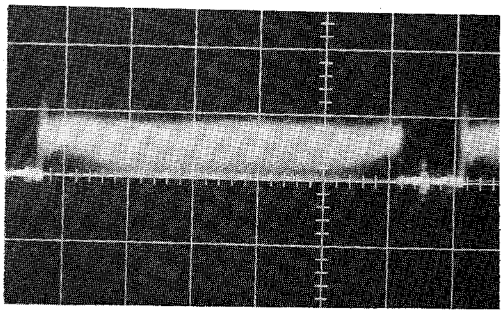
Note:
Set iris control to close and wait 5 minutes before making adjustment.

1. Connect the scope probe to TP304 and observe the signal at H. rate.
2. Adjust VR306 (OB Offset) so that (A) portion level of the signal is equal to blanking level.





Before 50mV/10msec.div.



After 50mV/10msec.div.

Fig.10

3. Set iris control to auto.

(4) INPUT LEVEL AND AUTO IRIS ADJUSTMENT

Note:

a. Steps 1,2,3 and 4 are only needed when the vidicon is replaced, or when the preamplifier board is replaced.

b. If reflection chart (gray scale) is used, a light intensity of 1400-2000 lux is required.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP303	VR305 Input level	Gray Scale	Scope	TP608 Hss
TP304	VR501 Auto. Iris control			

1. Misadjust VR604 fully clockwise or counterclockwise.
2. Aim the camera at gray scale chart.
3. Connect the scope probe to TP304 and observe the signal at H. rate.
4. Adjust VR501 for a signal level of 800 mVp-p.
5. Then, connect the scope probe to TP303 and observe the signal at H. rate.
6. Adjust VR305 for a signal level of 500 mVp-p.
7. Confirm that the signal level, at TP304, is 800 mVp-p.
8. If necessary, readjust VR501.

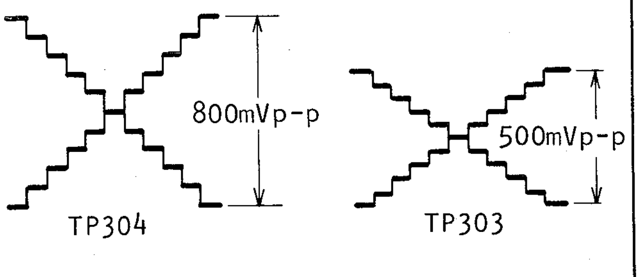


Fig.11

(5) FOCUS VOLTAGE ADJUSTMENT (COARSE)

1. Aim the camera at an evenly illuminated white surface (use 1500 lux. or Light Box) and focus the lens.
2. Adjust VR604 focus control for maximum magenta area and minimum green area in the monitor picture.

(6) BACK FOCUS ADJUSTMENT

1. Aim the camera at a distant object more than 10 meters (33 ft) and zoom in completely (maximum close up).
2. Focus the lens.
3. Loosen the hex screw holding the relay lens as shown in Fig. 12.

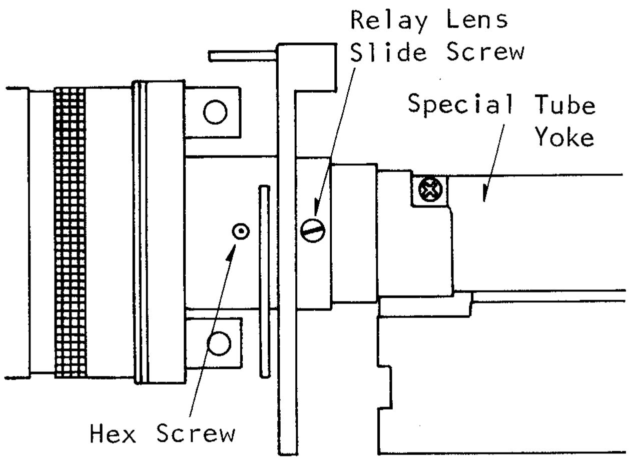


Fig.12 Deflection Yoke View

4. Zoom out (widen the field of view) and adjust the relay lens slide screw using a screw driver until best focus is obtained.
5. Repeat-steps 1, 2 and 4 until best focus is obtained over the entire zoom range of lens.
6. Tighten the hex screw loosened in step 3.
   DO NOT OVER TIGHTEN ... Lens.assembly or housing may crack.

(7) SPECIAL TUBE TURNING (ADJUSTMENT OF SPECIAL TUBE POSITION)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP305 3.58 MHz Carrier	VR604/ Special Tube Turning	White	Scope	TP605 Vss

1. Aim the camera at white chart or white screen.
2. Connect the scope to TP305 and observe the 3.58 MHz carrier signal at V. rate.
3. Adjust VR604 for the signal to be maximum level as shown in Fig. 13.

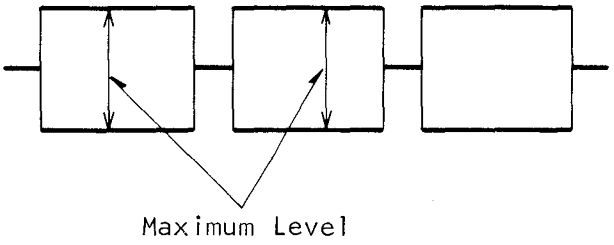


Fig.13

4. Using delayed sweep on the center of the V signal waveform, observe a few horizontal lines.
5. Loosen the special tube clamp screw on deflection yoke assembly as shown in Fig. 14.

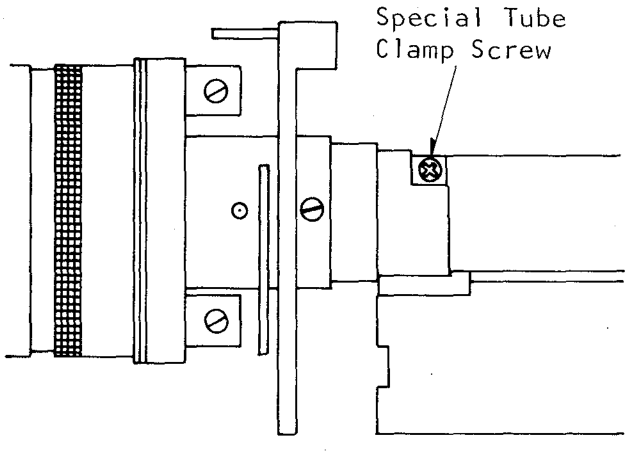


Fig.14 Deflection Yoke View

6. Now rotate the special tube from the back so that the wavefrom is without beat or ripple, for each H scan line. (Be careful when making this adjustment due to high voltage on the connector of special tube.) Amplitude differences may be expected. (See Fig. 15.)

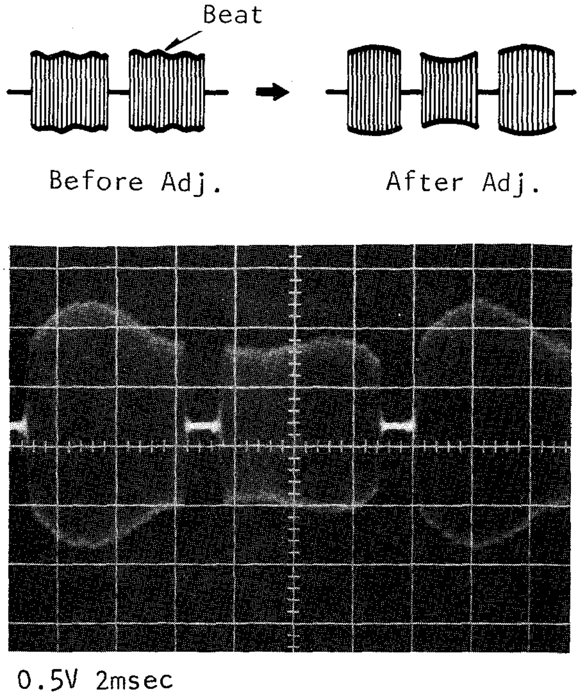


Fig.15 Photograph of proper Special Tube Turning

7. Tighten the special tube clamp screw.
   This is only a coarse adjustment. It will be repeated.

(8) BEAM ALIGNMENT (COARSE)

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	Two Alignment Rings	White	Color Monitor	/

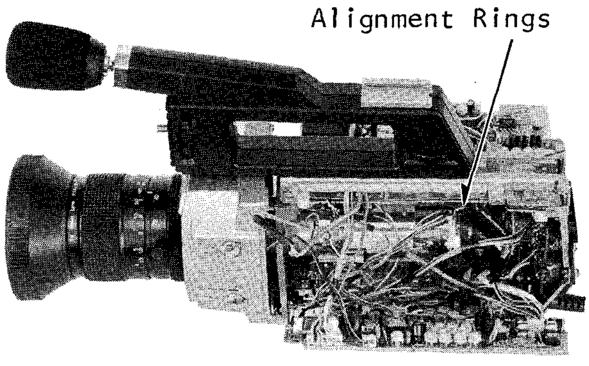

Alignment Rings

Fig.18

1. Aim the camera at white chart or white screen and turn the color control knob clockwise.
2. Observe the raster on monitor and adjust the two alignment rings (see Fig. 16) so that the magenta color covers on the whole screen as shown in Fig. 17.

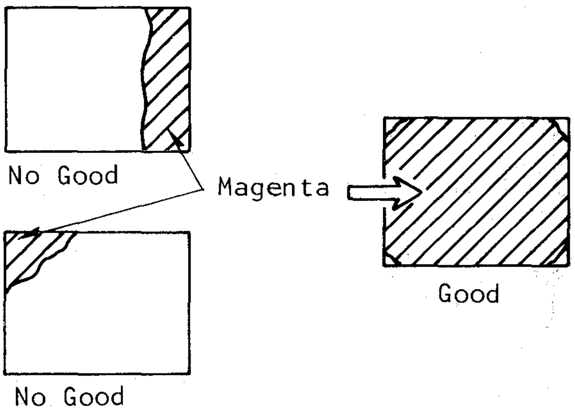

No Good
Magenta
Good
No Good

Fig.17 TV Screen

3. Turn the color control knob to center portion.

(9) HORIZONTAL LINEARITY AND SIZE ADJ.

Process Board/deflection board.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP305 3.58 MHz Carrier Composite Blanking	VR616 H. Size VR618 H. Lin (1) VR619 H. Lin (2)	White	Scope FM Detector (VFKS001)	TP608 Hss

1. Check and readjust Focus (VR604) if necessary.
2. Turn the FM Detector knob to Horizontal Size and Lin. position and the rear switch to 3.58 MHz position as shown in Fig. 18.

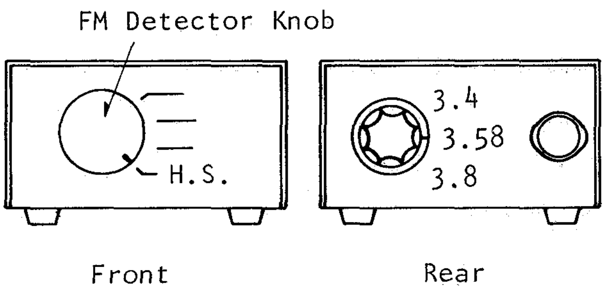

FM Detector Knob
H.S.
3.4
3.58
3.8
Front
Rear

Fig.18 FM Detector

3. Connect FM Detector (VFKS001) as shown in Fig. 19.

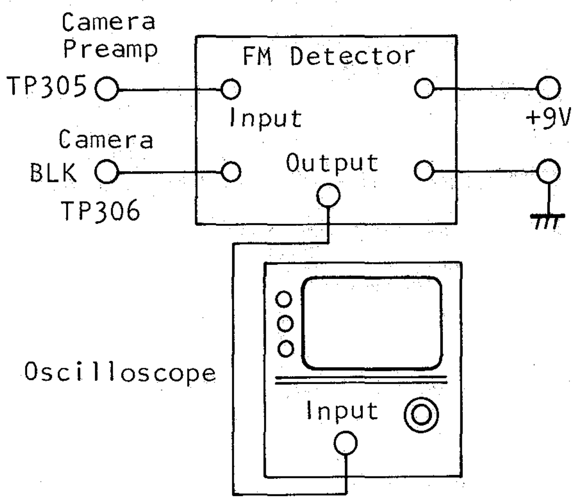

Camera Preamp
TP305
Camera BLK
TP306
FM Detector
Input
Output
+9V
Oscilloscope
Input

Fig.19 Connection of FM Detector

4. Adjust H. Size (VR616) so that the signal is centered on the Blanking Line, as shown in Fig. 20.

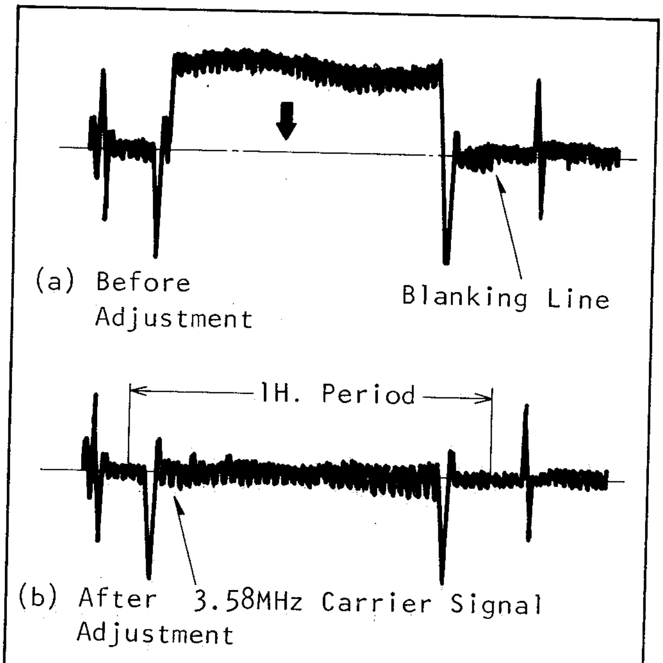


Fig.20 Waveform of Proper Adjustment

5. Adjust H. Lin. (1), VR618, and H. Lin. (2), VR619 so that the waveform on the scope is as flat as possible (see above figure (b)). H. Lin. (1) controls H. Sweep on the left side of the picture. H. Lin. (2) controls overall linearity.

(10) VERTICAL CENTERING AND VERTICAL SIZE ADJUSTMENT

A. Method 1 - coarse

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR602 V. Size VR603 V. Cent.	Registration Chart	Under Scanned Monitor	/

Note: If registration chart is not available, use METHOD 2 only.

1. Aim the camera at the registration chart placing it in the center of the under scanned monitor, so that the side arrows just touch the side of the raster.
2. Adjust V. Size control VR602 so that the top and bottom arrows just touch the ends of the raster (you may have to tilt the camera to achieve this adjustment), see Fig. 21.

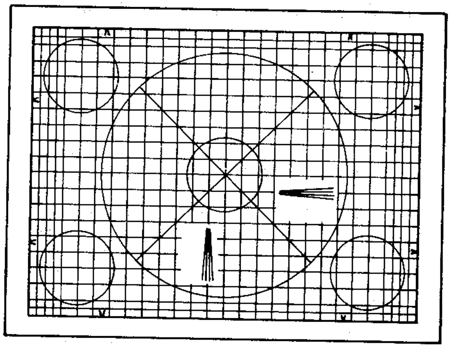


Fig.21 Under Scanned Monitor

3. Note the position of the center cross on ball chart and zoom out.
4. Adjust V. center VR603 so that the cross does not shift vertically as you zoom in and out.
5. Proceed to item 11.

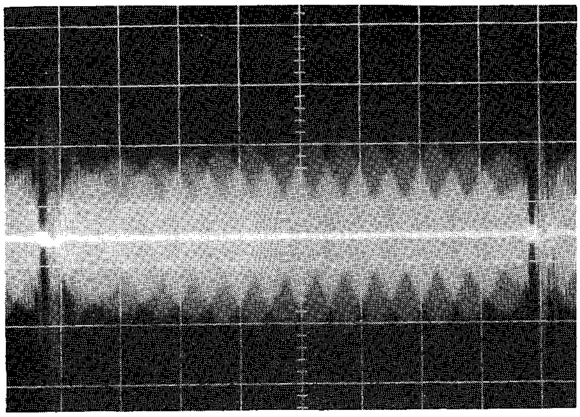
B. Method 2-Fine Adjustment(V. Size)

Note: Only used if no registration chart is available.

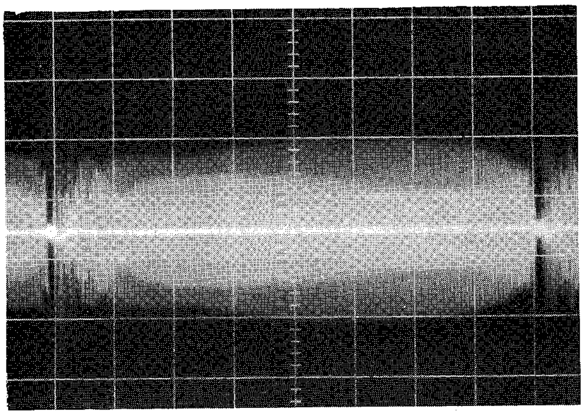
TP	Adj.	Chart	Test Instrument	Scope Trigger
TP305 3.58 MHz Carrier	VR602 V. Size VR603 V. Center	White	Scope	TP605 Vss

1. Aim the camera at a white chart.
2. Observe the vertical interval of 3.58 MHz carrier signal at TP305, trigger from TP605.
3. Adjust V. size control VR602 for minimum beat signal, see Fig. 22. If the V. size is not adjusted properly, beats will appear.
4. The proper adjustment will show less than two peaks per envelope.

5. Aim the camera at the samll object placing it in the center of the monitor screen.
6. Adjust V. center VR603 so that the small object does not shift vertically as you zoom in and out.



Before Adjustment
0.2V 2msec



After Adjustment
0.2V 2msec

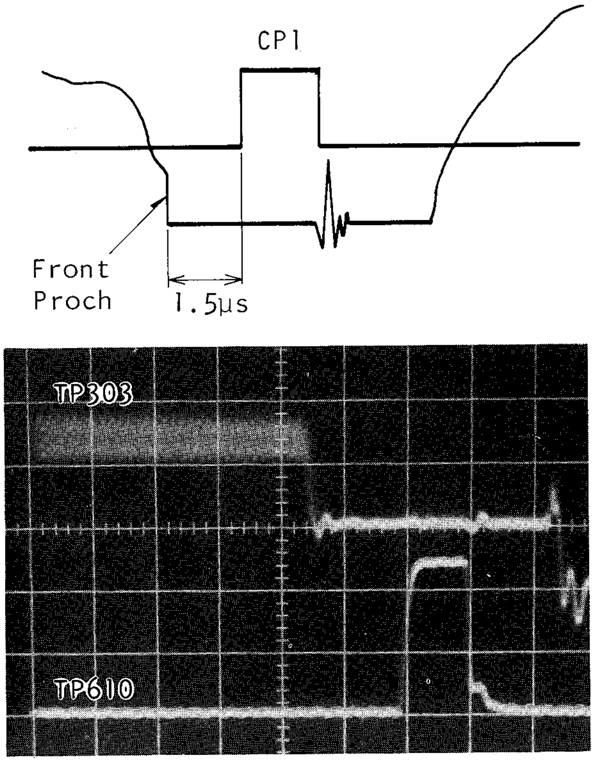
Fig.22 Waveform of V Period at TP307

(11) CONFIRM SPECIAL TUBE TURNING ADJUSTMENT
If necessary, repeat step 6 then proceed to step 12.

(12) HORIZONTAL CENTERING ADJUSTMENT
(Clamp Pulse Timing)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP303 Preamp. out TP610 CP1	VR617 H. Cent.	White	Scope	TP608 Hss

1. Aim the camera at white chart.
2. Connect one scope probe to TP303 and observe the horizontal blanking interval of signal.
3. Connect the other scope probe to TP610 (CP1).
4. Adjust horizontal centering control VR617 so that the trailing edge of video (front porch of optical black) and the leading edge of CP1 (Clamp Pulse-1) will be 1.5 μsec. as shown in Fig. 23.



1μsec.

Fig.23 Waveform for H. Cent.
(H. Blanking Signal at TP303 and CP1).

Note:
With some special tubes the scope display will show a double trace at the end of a horizontal line.
If this occurs, proceed as follows:

1. Confirm the special tube turning adjust.
2. If the special tube turning adjustment is OK, adjust VR617 so that the time between the trailing edge (a) of the video signal and the leading edge of CP1 will be 1.5μsec (Fig. 24).

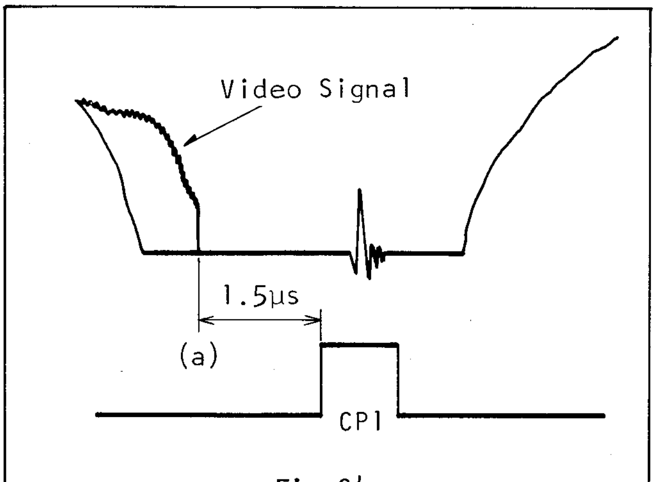


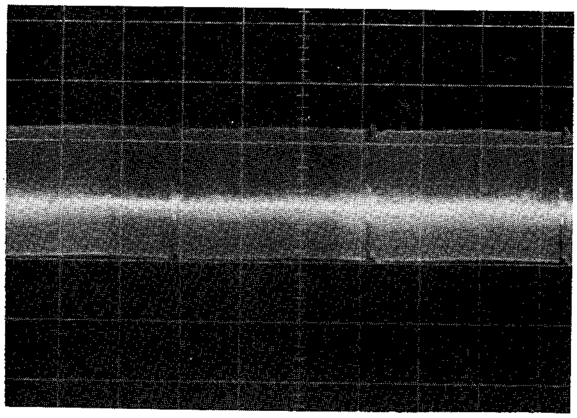
Fig.24

(13) CONFIRM BEAM CURRENT ADJUSTMENT
If target adjustment is made, check and readjust the beam current (step 2) if necessary.

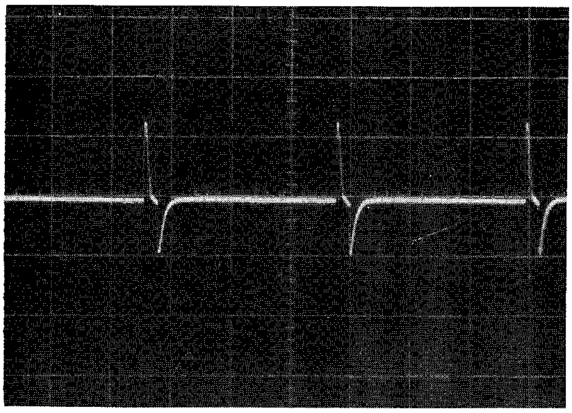
(14) DYNAMIC FOCUS ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP312 R-Y Signal	VR608 H. Saw. VR609 H. Par. VR610 V. Par. VR611 V. Saw.	White	Scope and Color Monitor	TP605 Vss TP608 Hss

1. Observe the waveform at TP604, it should be flat at H. and V. rate. If it is not flat, perform the following adjustments before the adjustment of dynamic focus.
2. For horizontal rate (Hss trigger), adjust VR609 (H. Parabola) and VR608 (H. Sawtooth) for a flat waveform, as shown in Fig. 25.



V.rate

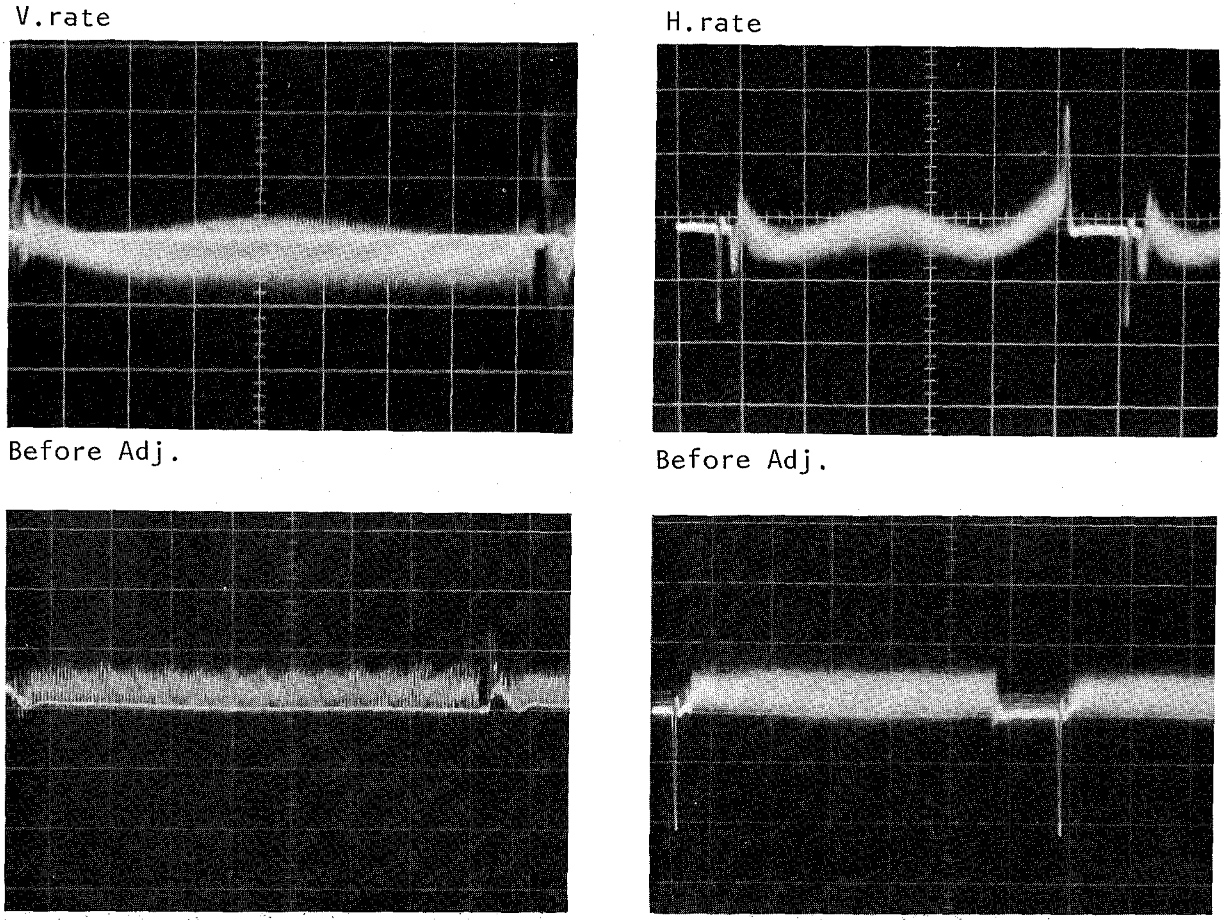


H.rate

Fig.25 Waveform of TP604

3. For vertical rate (Vss trigger), adjust VR611 (V. Parabola) and VR610 (V. Sawtooth) for a flat waveform in the same manner.
4. Observe the color monitor and adjust VR604 (Focus) so that center area shows red (Magenta) color (Minimize green).
5. Observe the waveform at TP312.
6. For H. rate (Hss trigger), adjust VR608 (H. Sawtooth) and VR609 (H. Parabola) for a flat waveform.
7. Similarly, for V. rate (Vss trigger), adjust VR610 and VR611 for a flat waveform.

8. Readjust VR608 & VR609 and VR610 and VR611 as described items 6 and 7.
9. Check the color monitor for green tinting at the corners or sides. The green color should be eliminated after the above adjustments in most cases.
10. If the green color has not been eliminated, fine adjust the alignment rings of the vidicon to eliminate the green color.
11. If the fine adjustment of alignment ring is performed, it is necessary to readjust the horizontal centering as described in step 12.


V.rate

H.rate

Before Adj.

Before Adj.

After Adj.

After Adj.

Fig.26 Dynamic Focus Waveform

12. Confirm that the adjustments for horizontal linearity and size as described in step (9) has not shifted.
13. Confirm that the adjustments for vertical size as described in step (10) has not shifted.

(15) COLOR SHADING ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP311 B-Y	VR612,VR613 VR624,VR627	White	Scope	TP608 Hss
TP312 R-Y Signal	VR614,VR615 VR625,VR626		Color Monitor	TP605 Vss

1. Shot a white field with a light intensity of about 4000 lux and connect probe at TP312.
2. Observe the R-Y signal at H rate at TP312.
3. Adjust VR322 (R gain) so that the R-Y signal touches the blanking line.
4. For horizontal rate (Hss trigger), adjust VR614 and VR615 for the R-Y signal waveform to be flatest during horizontal period as shown in Fig. 27.

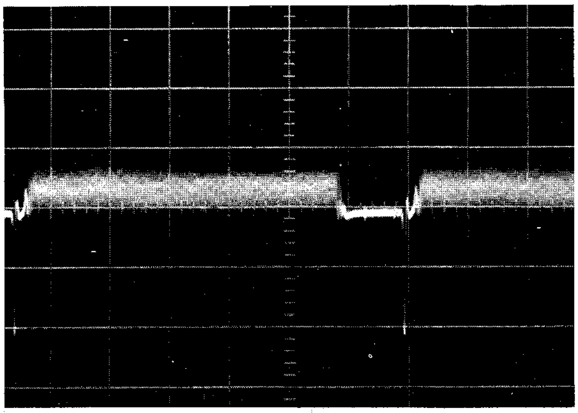


Fig.27 R-Y Signal (H.rate)

5. For vertical rate (Vss trigger), adjust VR625 and VR626 for the R-Y signal waveform to be flatest during vertical period as shown in Fig. 28.

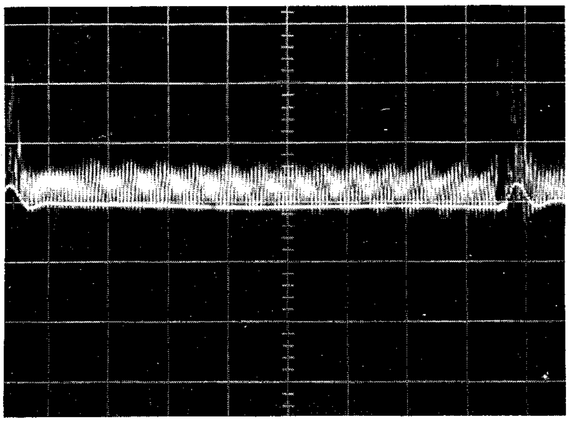


Fig.28 R-Y Signal (V.rate)

6. Observe the B-Y signal at H. and V. rate at TP311.
7. Adjust VR319 (B gain) so that the B-Y signal touches the blanking line.
8. For horizontal rate (Hss trigger), adjust VR612 and VR613 for the B-Y signal waveform to be flatest during horizontal, period as shown in Fig. 29.

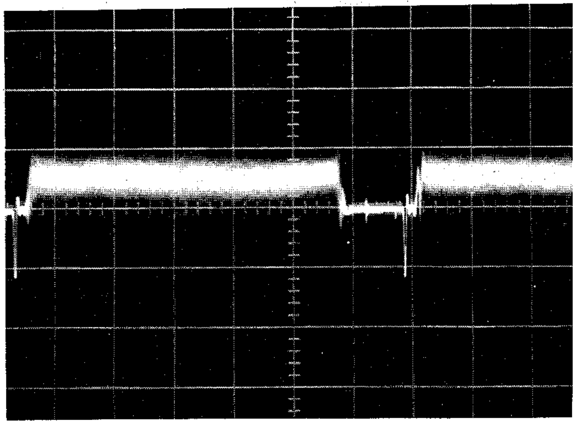


Fig.29 B-Y Signal (H.rate)

9. For vertical rate (Vss trigger), adjust VR624 and VR627 for the B-Y signal waveform to be flatest during vertical period in the same manner.

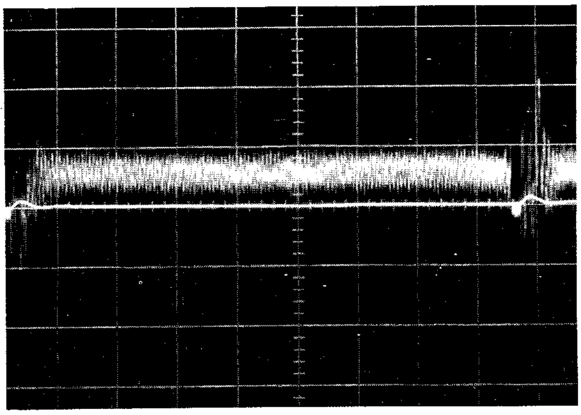
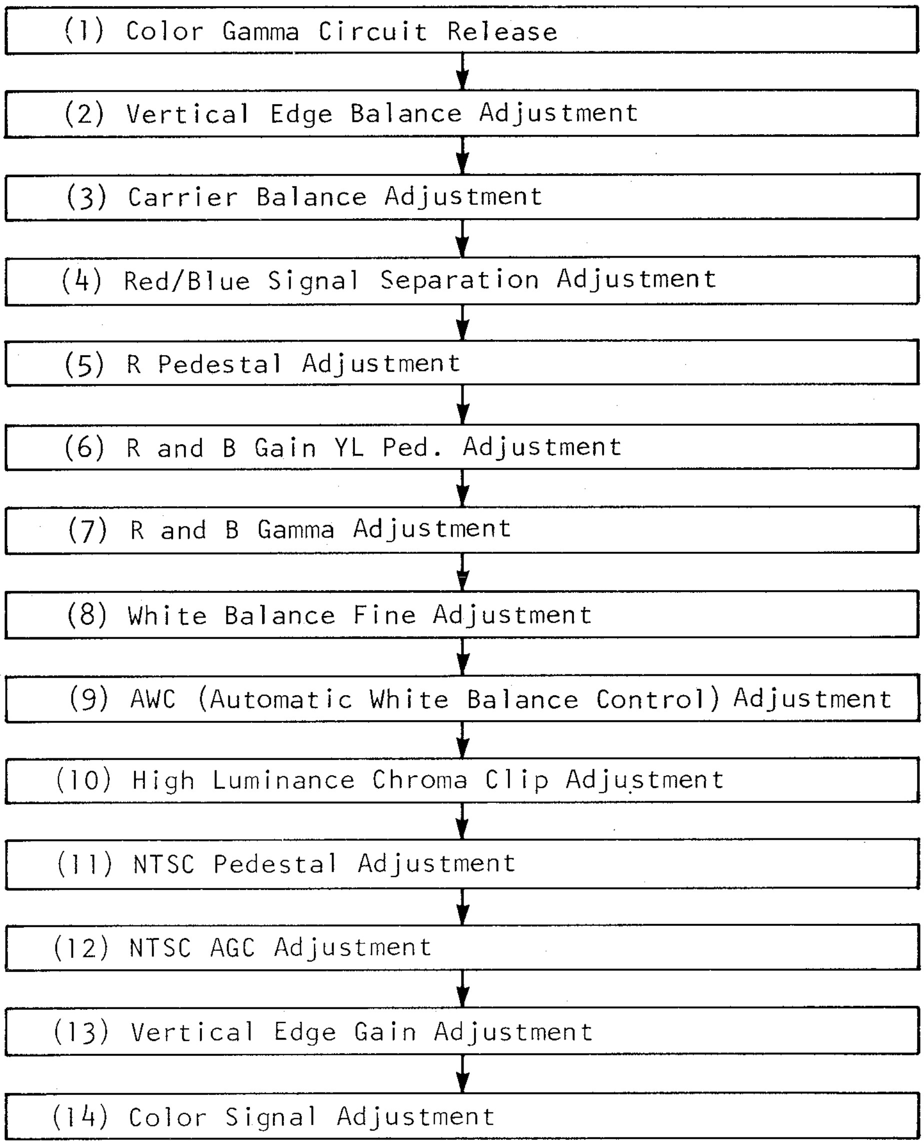


Fig.30 B-Y Signal (V.rate)

[3] PROCESS CIRCUIT ADJUSTMENT

ADJUSTMENT FLOW CHART FOR PROCESS CIRCUIT



(1) Color Gamma Circuit Release

(2) Vertical Edge Balance Adjustment

(3) Carrier Balance Adjustment

(4) Red/Blue Signal Separation Adjustment

(5) R Pedestal Adjustment

(6) R and B Gain YL Ped. Adjustment

(7) R and B Gamma Adjustment

(8) White Balance Fine Adjustment

(9) AWC (Automatic White Balance Control) Adjustment

(10) High Luminance Chroma Clip Adjustment

(11) NTSC Pedestal Adjustment

(12) NTSC AGC Adjustment

(13) Vertical Edge Gain Adjustment

(14) Color Signal Adjustment

Preparation:
Confirm the following items before proceeding with process circuit adjustment.

1. Position of User Adjustments
   Color Control Knob...............
   Center position
   Auto/Manual Iris Control SW......
   Auto position
   Color Temperature Correction SW..
   Off position
   (Indoor)
   AGC SW..........." ON " position
2. Test Pattern Light Box
   a test pattern light box is used for many adjustments. Make sure that the AC voltage is proper and the correct pattern is used for each step.
3. Reflection Chart
   When the reflection chart is used, the following light condition is required.
   Color Temperature: 3200 K
   Light Intensity : 1400∿2000 Lux (on the chart surface)
   Make sure that the correct pattern is used for each step.

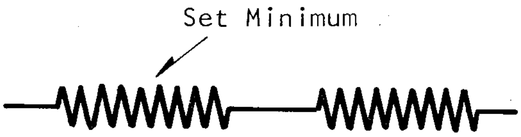
(1) COLOR GAMMA CIRCUIT RELEASE

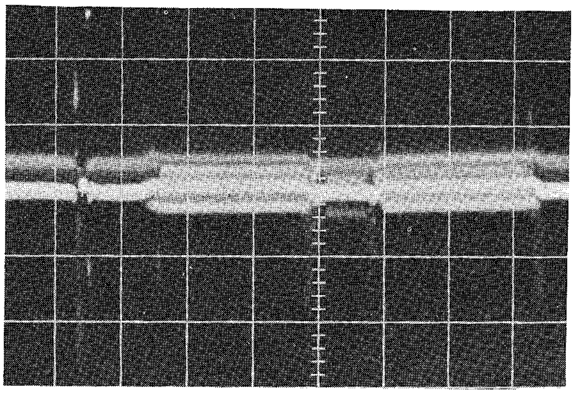
Turn VR308, 309, 310 and 311 fully clockwise, and turn VR312 fully counterclockwise.
(Note: adjust each potentiometer from the component side of circuit board).

(2) VERTICAL EDGE BALANCE ADJUSTMENT

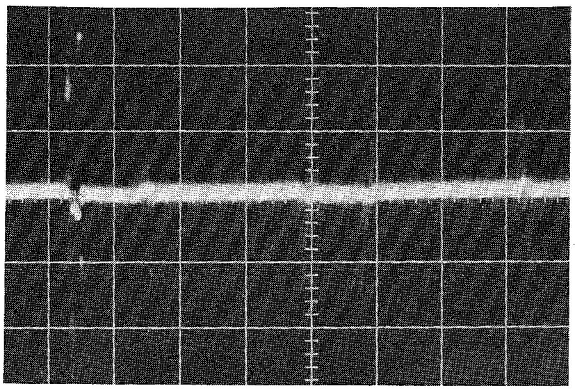
TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301 V-Edge Correction Signal	VR301 V-Edge Bal. TP302 V-Edge Gain	Gray-Scale	Scope	TP605 Vss

1. Aim the camera at the gray-scale chart.
2. Observe the waveform at TP301 and adjust VR302 so that the vertical correction signal at TP301 is maximized.
3. Adjust VR301 so that the video level is minimized as shown in Fig. 31.





No Good 20mV/2msec.div.



Good 20mV/2msec.div.

Fig. 31 V.Edge Correction Signal at TP301

4. Turn the VR302 fully counterclockwise position (component side).

(3) CARRIER BALANCE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
NTSC Signal	VR320 VR323	/	Scope	TP608 Hss

1. Set iris control to close (manual).
2. Confirm that the AWC indicator glows red. If not, turn the power off and wait 5 minutes, to release the AWC circuit. Then, turn the power on.
3. Connect probe at the video output connector on the power supply unit and observe the NTSC signal.
4. Alternately adjust VR320 and VR323 to minimize carrier leakage. (See Fig. 32).

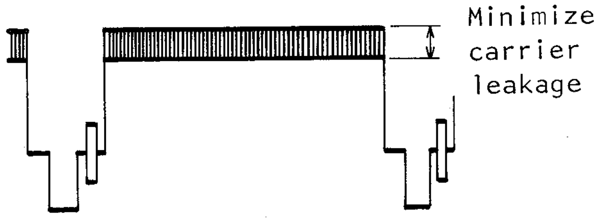


Fig.32

(4) RED/BLUE SIGNAL SEPARATION ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP308 B Signal TP310 R Signal	VR317 Separation Phase VR318 Separation Gain	Gray- Scale	Scope	TP608 Hss

1. Aim the camera at the gray-scale chart.
2. Observe the signal at TP308 and TP310 at the same time. If the B signal (TP308) has R contamination, the waveform will be unstable and has changing amplitude.
3. Adjust VR318 to minimize instability and waveform flicker.
4. Adjust VR317 for same effect.
5. Alternately adjust VR317 and VR318 to minimize the waveform flicker.

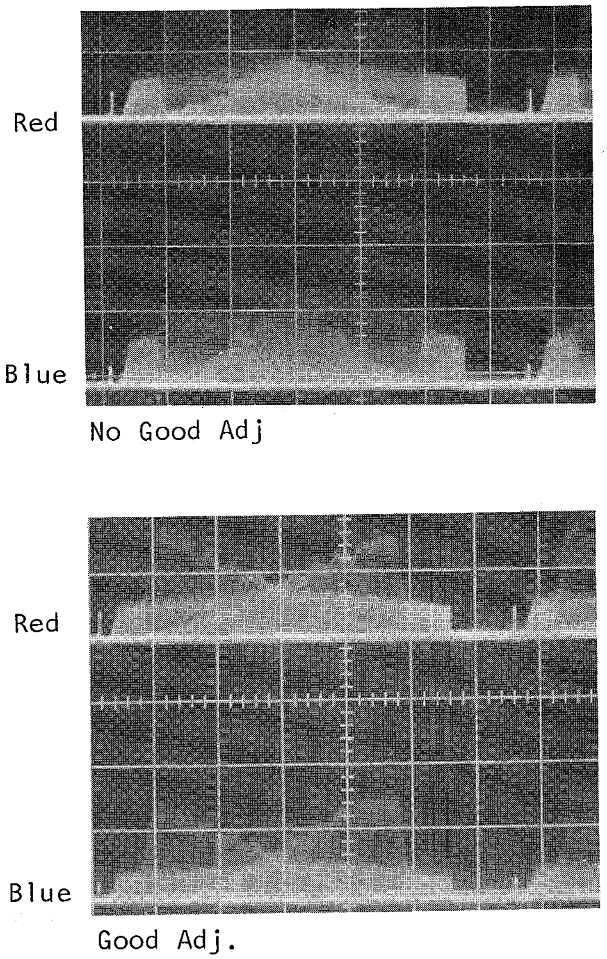


Fig.33

(5) B PEDESTAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR321 B. Ped.	Gray- Scale	Color Monitor	/

1. Aim the camera at the gray-scale chart.
2. Observe the color monitor and adjust VR321 so that the monitor shows blue color (maximize blue)

(6) R AND B GAIN YL PEDESTAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
NTSC Signal (Output Signal)	VR319 VR322 VR307 VR320 VR323	Gray-Scale	Scope	TP608 Hss

Note:
Confirm the each VR knob and SW positions before proceeding this adjustment.

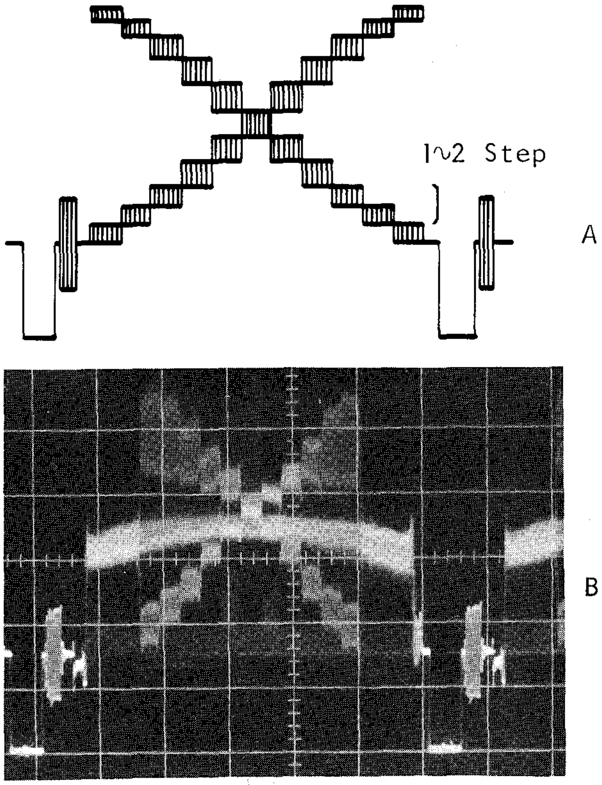
Color Control Knob .... Center position (detent position)

Auto/Manual Iris Control SW .... Auto position

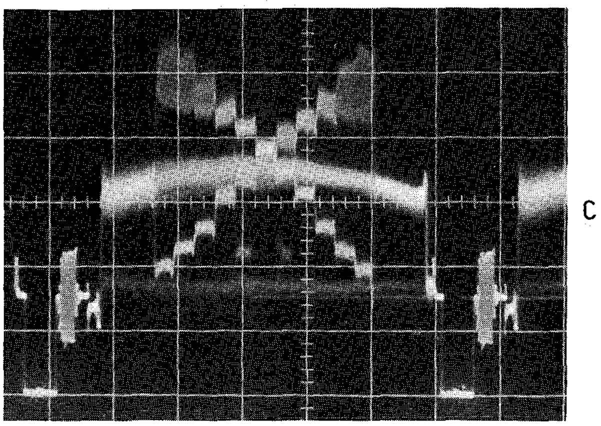
Color Temeprature Correction SW ..... "Indoor" position

AGC SW .... "ON" position

1. Aim the camera at the gray-scale and observe the NTSC signal.
2. Adjust VR307 (YL Ped.) to minimize carrier leakage on the first or second steps from the bottom (See Fig. 34-A).
3. Alternately adjust VR319 (B gain) and VR322 (R gain) to minimize the carrier leakage on the bottom half or gray-scale waveform (steps 1 through 6).
4. Alternately repeat steps 2 and 3 to minimize carrier leakage on the bottom half of gray-scale (steps 1 through 6, including gray background), see Fig. 34.



Before Adj.



After Adj.

Fig.34 NTSC Waveform

5. If there is excessive carrier leakage at the one or two steps from the bottom, adjust VR320, VR323 and VR321 to minimize it.

(7) R AND B GAMMA ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
NTSC Signal	VR312 Gamma Reference Voltage VR310 R gamma VR311 R degamma VR308 B gamma VR309 B degamma	Gray-Scale	Scope	TP608 Hss

1. Aim the camera at the gray-scale.
2. Connect scope probe to the video output connector on the power supply unit and observe the NTS signal.
3. Turn VR310 (R gamma) fully counter-clockwise.
4. Adjust VR312 (gamma reference voltage) so that the chroma knee point is located 5 steps from the top, then turn VR310 to fully clockwise, to release R gamma.
5. Adjust VR310 (R gamma) and VR308 (B gamma) to minimize the carrier leakage at third through fifth steps from the top.
6. Adjust VR311 (R degamma) and VR309 (B degamma) to minimize carrier leakage at first through third steps from the top.

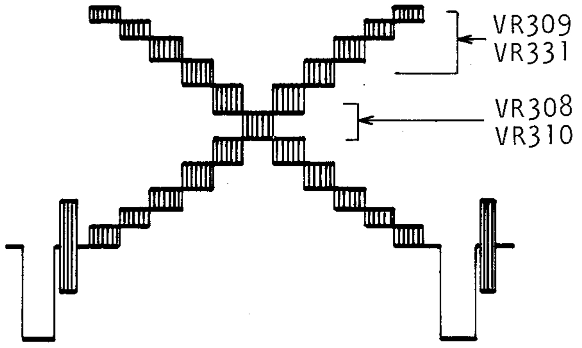


Fig.35 NTSC Waveform

Note:
It is normal to have some residual carrier leakage ... particularly at the top steps of the waveform, depending on tube quality.

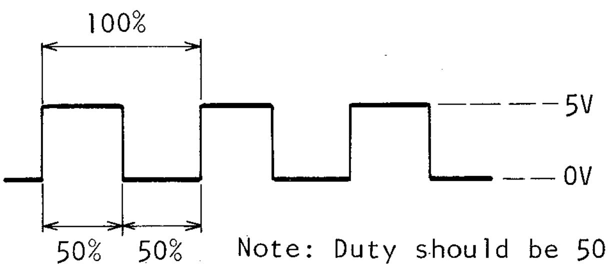
(8) WHITE BALANCE FINE ADJUSTMENT

Repeat (6) R and B gain adjustment and (7) R and B gamma adjustment.

(9) AWC (AUTOMATIC WHITE BALANCE CONTROL) ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP615 R-Y Comparator signal	VR701	Gray-Scale	Scope	TP605 Vss
TP616 B-Y Comparator signal	VR702			

1. Turn the power off and wait 5 minutes, to release the automatic white balance control (AWC).
2. Then, turn the power on and confirm that the AWC indicator glows red.
3. Aim the camera at the gray-scale chart and check for no color in picture.(correct white balance)
4. Connect scope probe to TP615 and observe the waveform at V. rate.
5. Place the scope in DC mode.
6. Adjust VR701 so that the signal appears as shown below.



Note: Duty should be 50%

Fig.36

7. Connect probe to TP616 and observe the waveform at V. rate.
8. Adjust VR702 in the same manner.
9. Aim the camera at white chart.
10. Confirm that white balance is correct when the AWC switch is turned on.

(10) HIGH LUMINANCE CHROMA CLIP ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR303 H.C. Gain	Gray Scale	Monitor	/

1. Aim the camera at the gray-scale chart and observe the picture on the monitor.
2. Zoom out to 12mm.
3. Check whether the high luminance part, from the whitest step of the gray-scale to the fourth step shows greenish or yellowish response, adjust VR303 (H.C. GAIN) to eliminate this, as shown in Fig. 37. The picture should be white/gray during these steps.

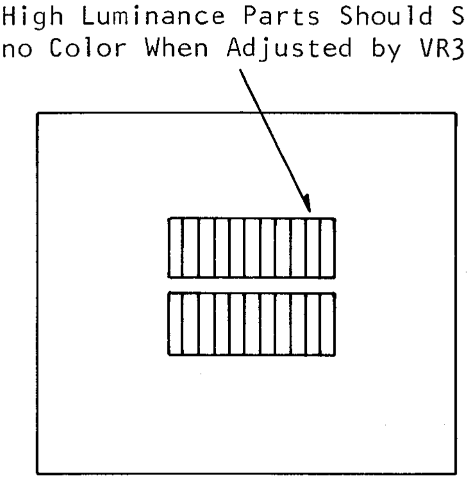

High Luminance Parts Should Show no Color When Adjusted by VR303

Fig.37

(11) NTSC PEDESTAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
NTSC Signal	VR313 NTSC Ped.	/	Scope Monitor	TP608 Hss

1. Connect the NTSC output terminal (Camera) to the monitor TV.
2. Set iris control to close and observe the NTSC signal (Camera output).
3. Adjust VR313 for 0.07 Vp-p as shown in Fig. 38.

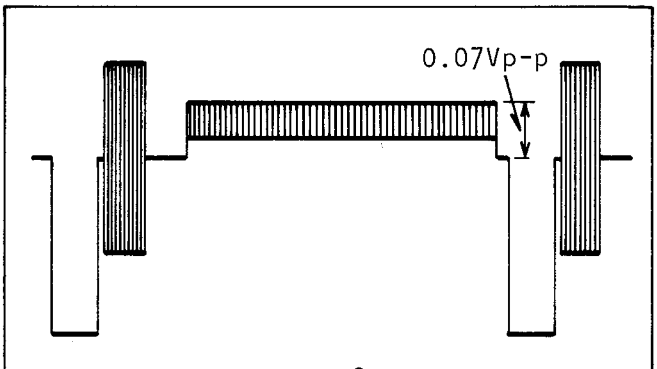


Fig.38

(12) NTSC AGC ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
NTSC Signal	VR315 AGC Level	Gray Scale	Scope	TP608 Hss

1. Aim the camera at the gray-scale chart and observe the NTSC signal (Camera output).
2. Adjust VR315 for 0.7V as shown in Fig. 39.

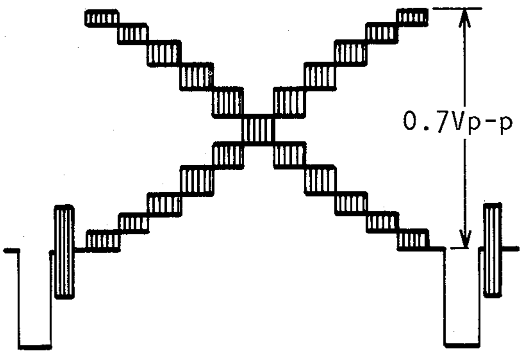


Fig.39 NTSC Waveform

(13) VERTICAL EDGE GAIN ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR302 V. Edge Gain	Gray Scale	Monitor	/

1. Aim the camera at the gray-scale chart and observe the picture on the monitor.
2. Adjust VR302 to eliminate color fringing on upper and lower edges of the gray-scale, as shown in Fig. 40.

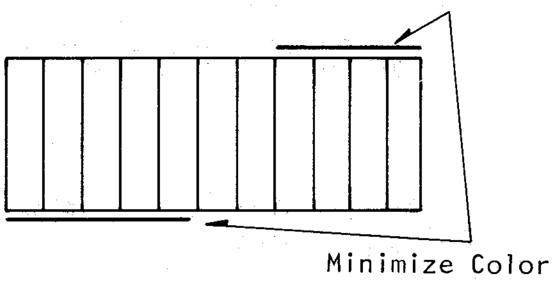


Fig.40 Picture of Gray-Scale

(14) COLOR SIGNAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
NTSC Signal	VR316 BF Phase VR324 B-Y gain C326 Phase VR304 Color Level VR319 B gain VR322 R Gain	Color Bar Chart Gray-scale chart	Vectorscope	

Note:
Confirm that the AWC indicator, on the EVF, glows red, before proceeding with this adjustment.
If not, turn the power off and wait 5 minutes to release the AWC circuit.
Then, turn the power on.

1. Aim the camera at the color bar chart.
2. Connect the vectorscope to the video output connector on the power supply unit.
3. Observe the screen of vectorscope and adjust VR319 (B gain) and VR322 (R gain) so that the center spot (white) of vector is positioned in the center of screen as shown in Fig. 41, if necessary.

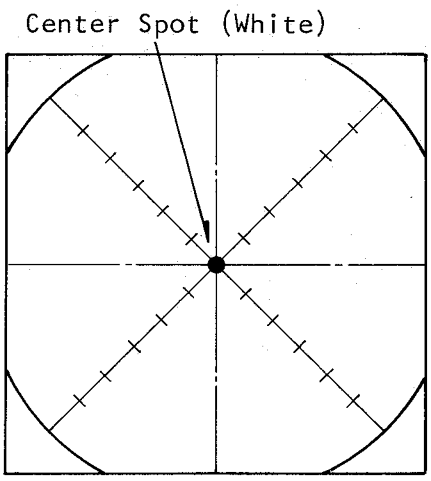


Fig.41 Screen of Vectorscope

4. Adjust the amplitude of R signal with VR304 (color level) to be within specification as shown below.
5. Adjust the total phase with VR316, VR324 and C326 to be within specification as shown below.

Specification:

1) Phase

Signal	Vector Phase
R	$104^\circ \pm 15^\circ$
YL	$168^\circ\ {}^{+10^\circ}_{-30^\circ}$
CY	$284^\circ\ {}^{+20^\circ}_{-15^\circ}$

2) Amplitude

a. The amplitude of R signal is 1.5 times the burst signal.
b. The amplitude of YL signal is 1.0 ± 0.3 times the R signal.

Note:
If VR319 and VR322 are adjusted in step 3, the following adjustment is required:

1. Aim the camera at the gray-scale chart and observe the NTSC signal
2. Adjust VR319 and VR322 to minimize the carrier leakage of the NTSC signal.

[4] Electronic Viewfinder Circuit

Preparation:

1. Connect the viewfinder connector to the E.V.F. connector on the camera head.
2. Confirm that all VRs are in the center positions.
3. Set each control as follows:
   a) Contrast VR: Maximum
   b) Brightness VR: Center

(1) Horizontal Frequency

1. Set Power "ON".
2. Shoot the test pattern.
3. Short the base and emitter of Q903 using a jumper.
4. Adjust L905 for stable horizontal scanning.
5. If the horizontal picture center is improperly positioned, adjust the center ring on the deflection coil assembly.
6. If the brightness is incorrect, adjust VR904 (Brightness).
7. Remove the jumper between base and emitter of Q903.

(2) Vertical Height

1. Shoot the test pattern.
2. Adjust VR902 so that the vertical height is approx. 110% overscanned.

(3) Focus

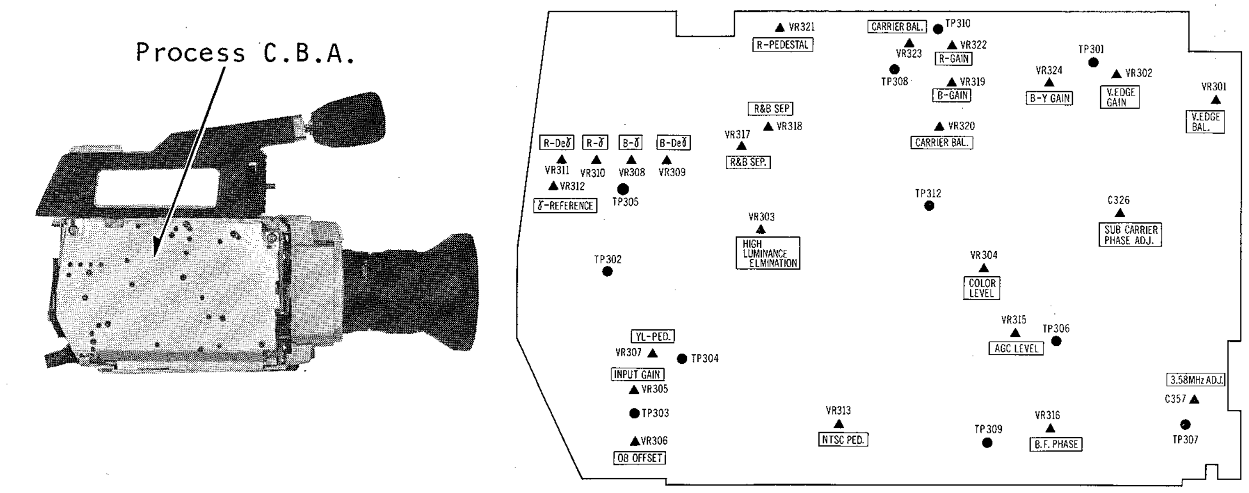
1. Shoot the test pattern.
2. If the focus on viewfinder is improper but the picture on the monitor is OK, adjust VR903.

(4) High Voltage
Confirm that the CRT high voltage is $3.5\ \text{kV} \pm 0.3\ \text{kV}$ using a high voltage meter.

Location of Test Points and Controls

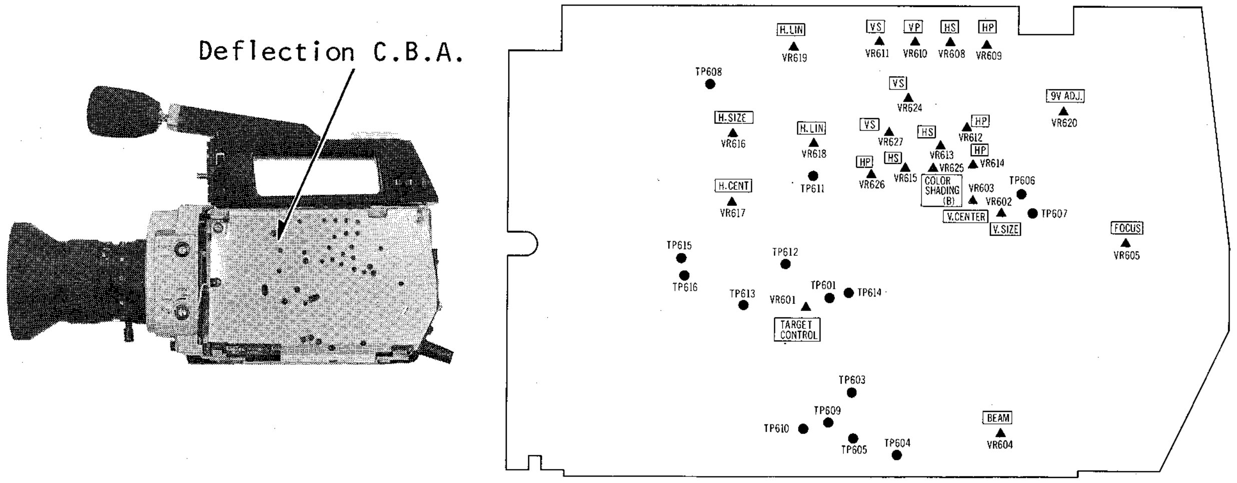
Process C.B.A.

VEPW0060B


Process C.B.A.
VR321
R-PEDESTAL
CARRIER BAL.
TP310
VR323
VR322
R-GAIN
TP308
VR319
B-GAIN
VR324
B-Y GAIN
TP301
VR302
V.EDGE GAIN
VR301
V.EDGE BAL.
R&B SEP
VR318
VR317
R&B SEP.
VR320
CARRIER BAL.
R-Deγ
R-γ
B-γ
B-Deγ
VR311
VR310
VR308
VR309
VR312
γ-REFERENCE
TP305
TP312
C326
SUB CARRIER PHASE ADJ.
VR303
HIGH LUMINANCE ELMINATION
TP302
VR304
COLOR LEVEL
VR315
TP306
AGC LEVEL
YL-PED.
VR307
TP304
INPUT GAIN
VR305
TP303
VR306
OB OFFSET
VR313
NTSC PED.
TP309
VR316
B.F. PHASE
3.58MHz ADJ.
C357
TP307

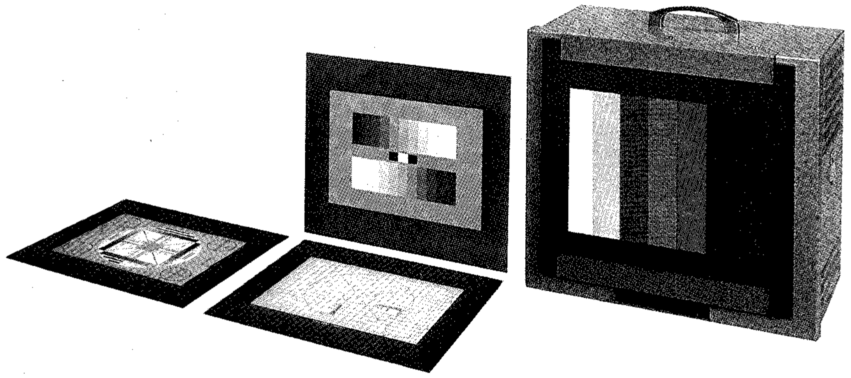
Deflection C.B.A.

VEPW0061B

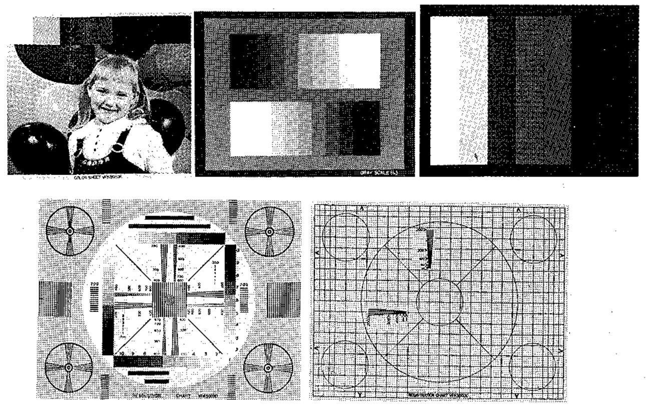

Deflection C.B.A.
H.LIN
VR619
VS
VP
HS
HP
VR611
VR610
VR608
VR609
TP608
VS
VR624
9V ADJ.
VR620
H.SIZE
VR616
H.LIN
VR618
VS
VR627
HS
VR613
HP
VR612
HP
VR614
HP
VR626
HS
VR615
VR625
TP611
COLOR SHADING (B)
VR603
VR602
TP606
TP607
V.CENTER
V.SIZE
H.CENT
VR617
FOCUS
VR605
TP615
TP616
TP612
TP613
VR601
TP601
TP614
TARGET CONTROL
TP603
TP609
TP610
TP605
TP604
BEAM
VR604

COLOR CAMERA SERVICING FIXTURES

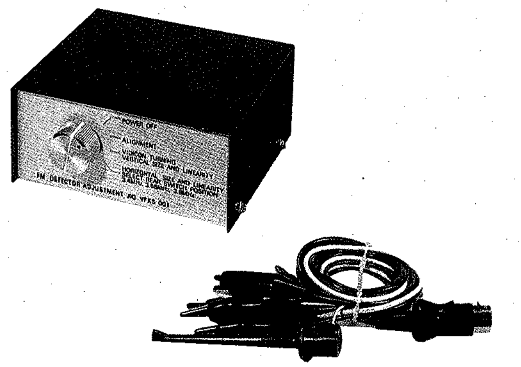
LIGHT BOX w/CHART SET VFKS002



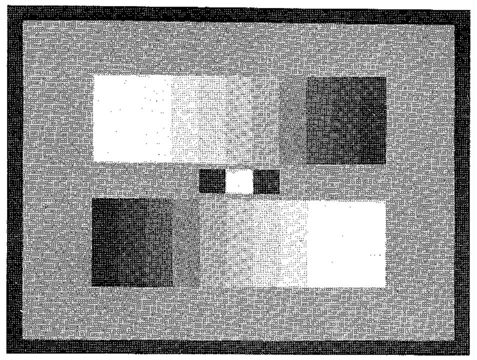
REFLECTION CHART SET VFKS003



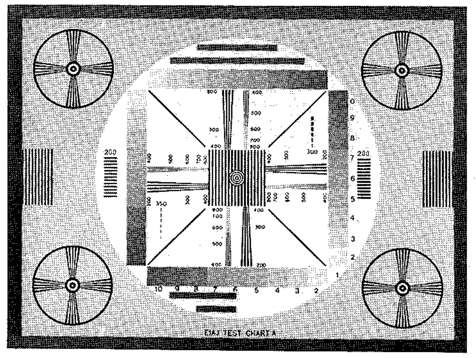
FM DETECTOR VFKS001



GRAY SCALE CHART VFKS002A



RESOLUTION CHART VFKS002D



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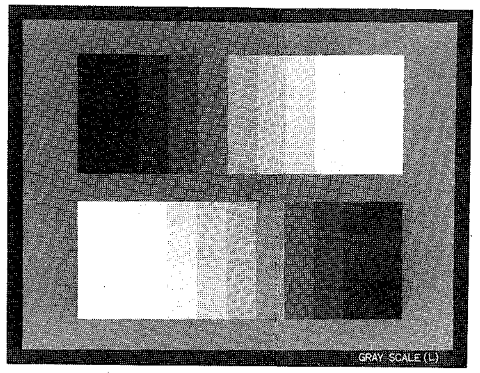
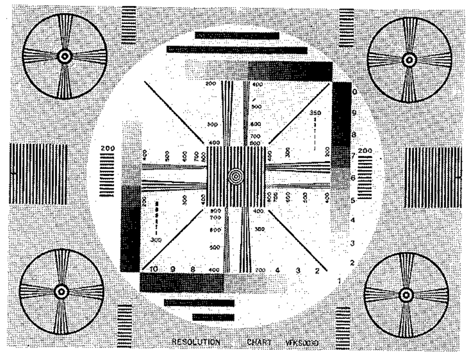
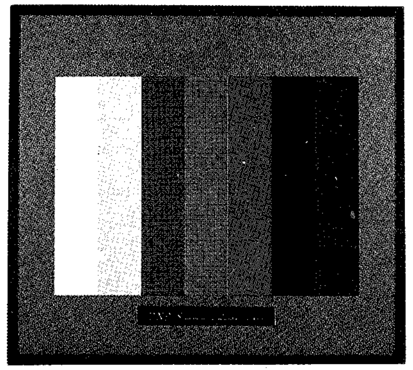


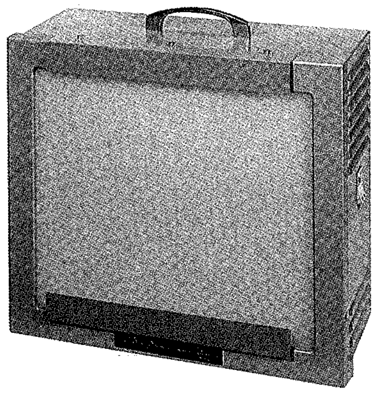
RESOLUTION CHART VFKS003D



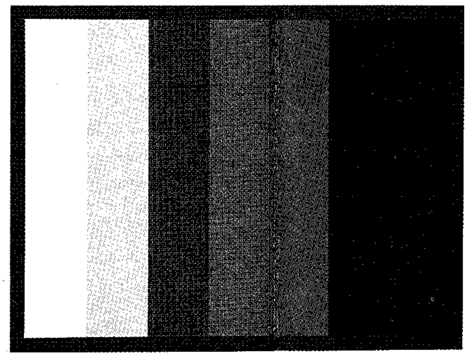
COLOR CHART VFKS002B



LIGHT BOX VFKS002Y



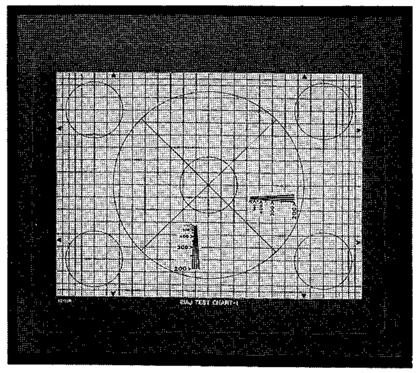
COLOR CHART VFKS003B



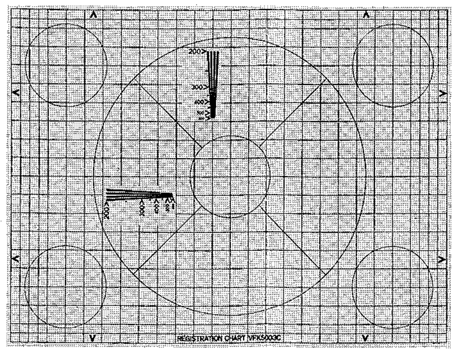
COLOR SHEET VFKS003E

COLOR SHEET VFKS003E

REGISTRATION CHART VFKS002C



REGISTRATION CHART VFKS003C



ORDER NO. VRD-8106-876

Service Manual

Color Video Camera

PK-801

Vol. 3

Block Diagrams

SPECIFICATIONS:

Power Source: DC 12 V ± 10%
AC 120 V ± 10%, 60 Hz ± 0.5%
(with Power Supply Unit)
Power Consumption: DC 7.5 W at 12 V DC (Battery)
(with E.V.F) DC 0.7 W at Standby
Special Tube System: 2/3″ frequency separation single tube system (built-in stripe filter)
Signal Carrier Frequency: 3.58 MHz
Focus System: Electro-static type
Lens Mounting: Built-in zoom lens (not "C" mount)
Lens: 6:1 zoom lens with auto/manual iris control.
Auto zoom lens and macro construction
F: 1.4, f: 12 mm—72 mm,
d: 1.3 m—infinity
Light Sensitivity: Minimum light intensity on optical image: 50 Lux (F: 1.4)
Optimum light intensity on optical image: 900 Lux
Video Output Level: 1.0 Vp-p, 75Ω (M type coaxial connector)
(Standard NTSC signal)
Sync. System: Internal Sync: RS-170
Signal to Noise Ratio: More than 43 dB
Horizontal Resolution: More than 240 lines
Color Temperature Control: 2 step switch (indoor, outdoor) & auto adjust

Microphone: Condenser Microphone
Audio Output Level: −20 dB, Hi-impedance
Audio Output Impedance: High impedance (1 KΩ)
External Microphone Input Impedance: 600Ω unbalanced
Electronic Viewfinder: Monochrome 1.5 inch CRT
Operating Temperature: 5°C to 35°C
Operating Humidity: 10% to 75%
Operating Position: Normal position only
Weight: Camera Head with E.V.F
6.3 lbs (with lens, 7 ft. cable & shoulder pad/handle grip)
AC adaptor (option)
2.4 lbs
Demensions: Camera Head with E.V.F
7″(W) × 8″(H) × 13″(D)
177 mm(W) × 210 mm(H) × 318 mm(D)
AC adaptor (option)
3″(W) × 3″(H) × 6″(D)
80 mm(W) × 75 mm(H) × 149 mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave, 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

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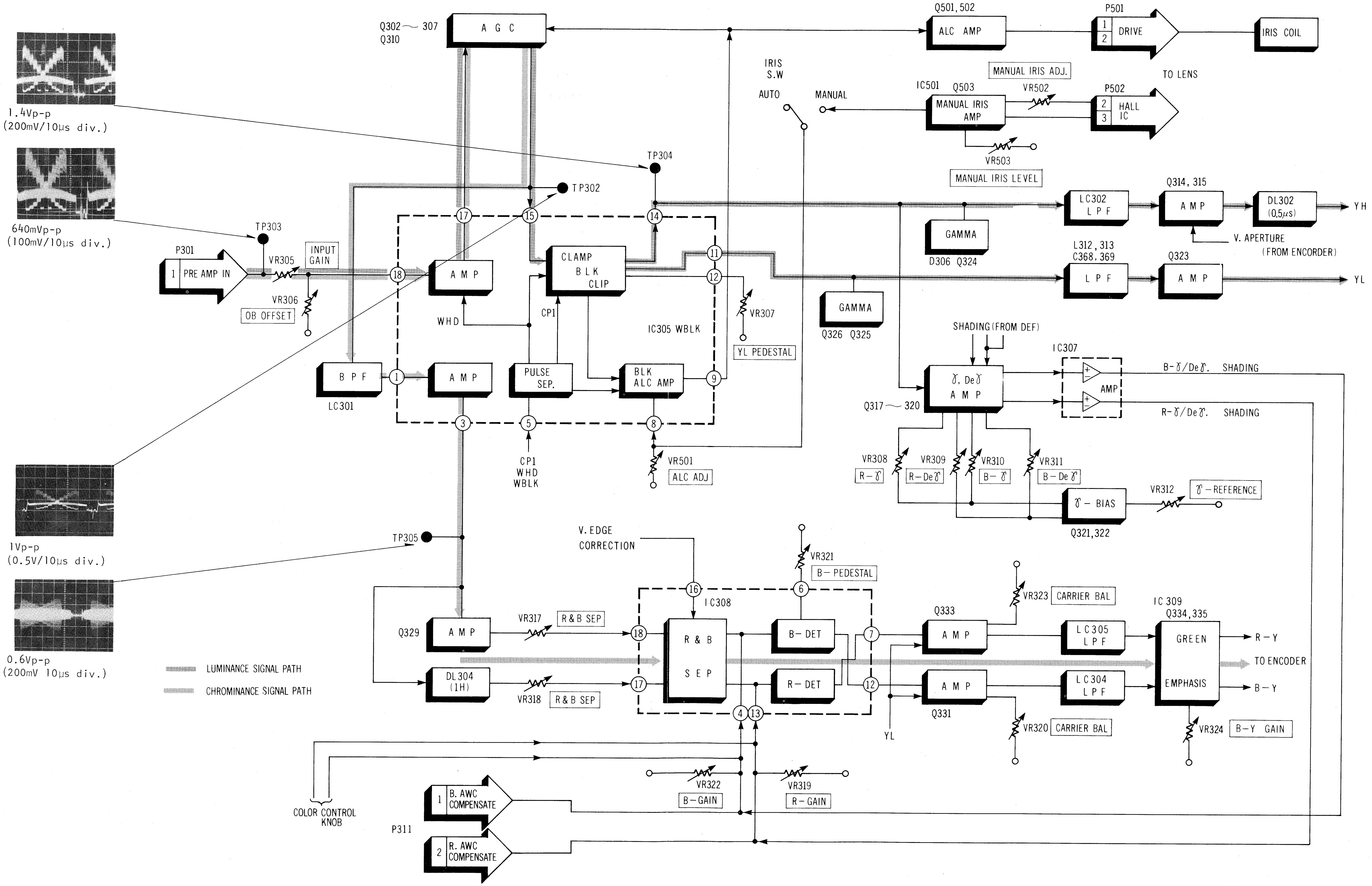
DEFLECTION BLOCK DIAGRAM 3-4

FADER BLOCK DIAGRAM 3-5

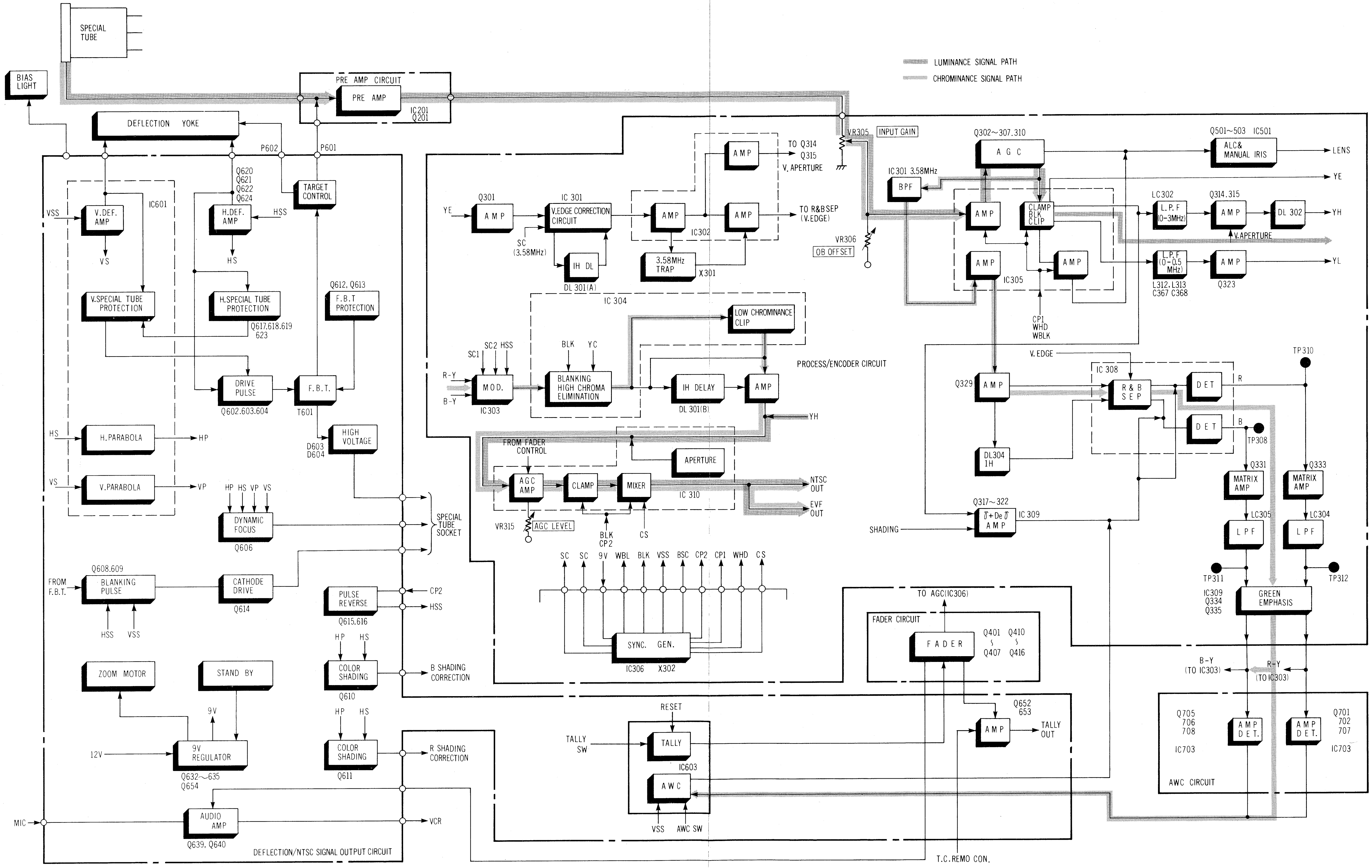
AWC BLOCK DIAGRAM 3-5

ELECTRONIC VIEWFINDER BLOCK DIAGRAM 3-6

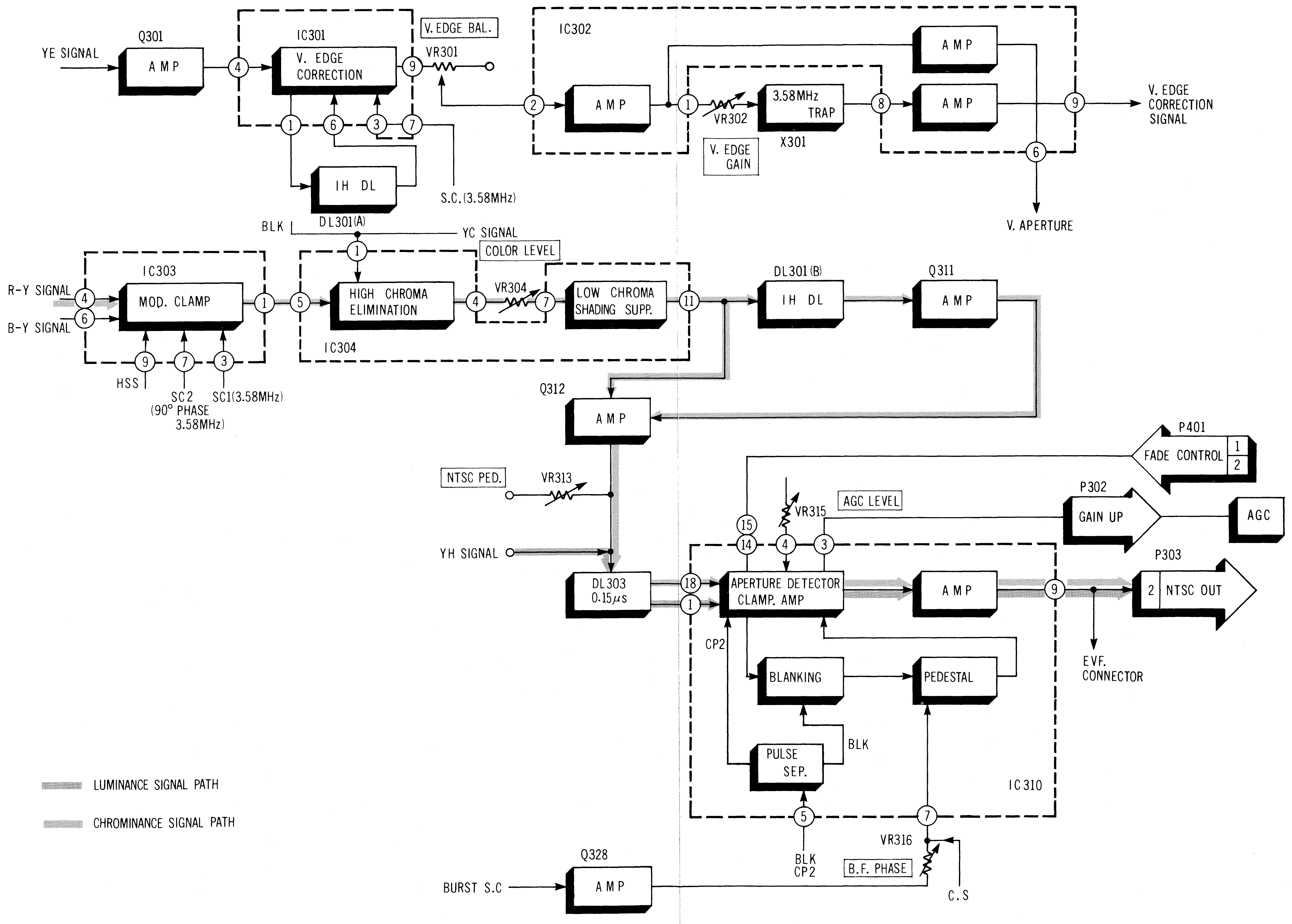
PROCESS BLOCK DIAGRAM


1.4Vp-p
(200mV/10μs div.)
640mVp-p
(100mV/10μs div.)
1Vp-p
(0.5V/10μs div.)
0.6Vp-p
(200mV 10μs div.)
Q302 ~ 307
Q310
A G C
Q501, 502
ALC AMP
P501
1
2
DRIVE
IRIS COIL
TO LENS
IRIS
S.W
AUTO
MANUAL
MANUAL IRIS ADJ.
IC501 Q503
VR502
MANUAL IRIS AMP
P502
2
3
HALL IC
VR503
MANUAL IRIS LEVEL
TP304
TP302
TP303
P301
1 PRE AMP IN
VR305
INPUT GAIN
VR306
OB OFFSET
17
15
14
11
12
18
A M P
CLAMP
B L K
CLIP
WHD
CP1
VR307
YL PEDESTAL
IC305 WBLK
B P F
LC301
1
PULSE SEP.
BLK ALC AMP
9
3
5
8
CP1
WHD
WBLK
VR501
ALC ADJ
LC302
L P F
Q314, 315
A M P
DL302
(0.5μs)
YH
GAMMA
D306 Q324
V. APERTURE
(FROM ENCORDER)
L312, 313
C368, 369
L P F
Q323
A M P
YL
GAMMA
Q326 Q325
SHADING (FROM DEF)
IC307
γ, Deγ
A M P
Q317 ~ 320
AMP
B-γ/Deγ. SHADING
R-γ/Deγ. SHADING
VR308
R-γ
VR309
R-Deγ
VR310
B-γ
VR311
B-Deγ
γ - BIAS
Q321,322
VR312
γ - REFERENCE
TP305
V. EDGE
CORRECTION
VR321
B- PEDESTAL
16
6
IC308
Q329
A M P
VR317
R & B SEP
18
R & B
S E P
B- DET
R- DET
7
12
17
4
13
DL304
(1H)
VR318
R & B SEP
Q333
A M P
VR323
CARRIER BAL
LC305
L P F
IC 309
Q334, 335
GREEN
EMPHASIS
R-Y
TO ENCODER
B-Y
A M P
Q331
YL
LC304
L P F
VR320
CARRIER BAL
VR324
B-Y GAIN
VR322
B-GAIN
VR319
R-GAIN
LUMINANCE SIGNAL PATH
CHROMINANCE SIGNAL PATH
COLOR CONTROL KNOB
1
B. AWC COMPENSATE
P311
2
R. AWC COMPENSATE

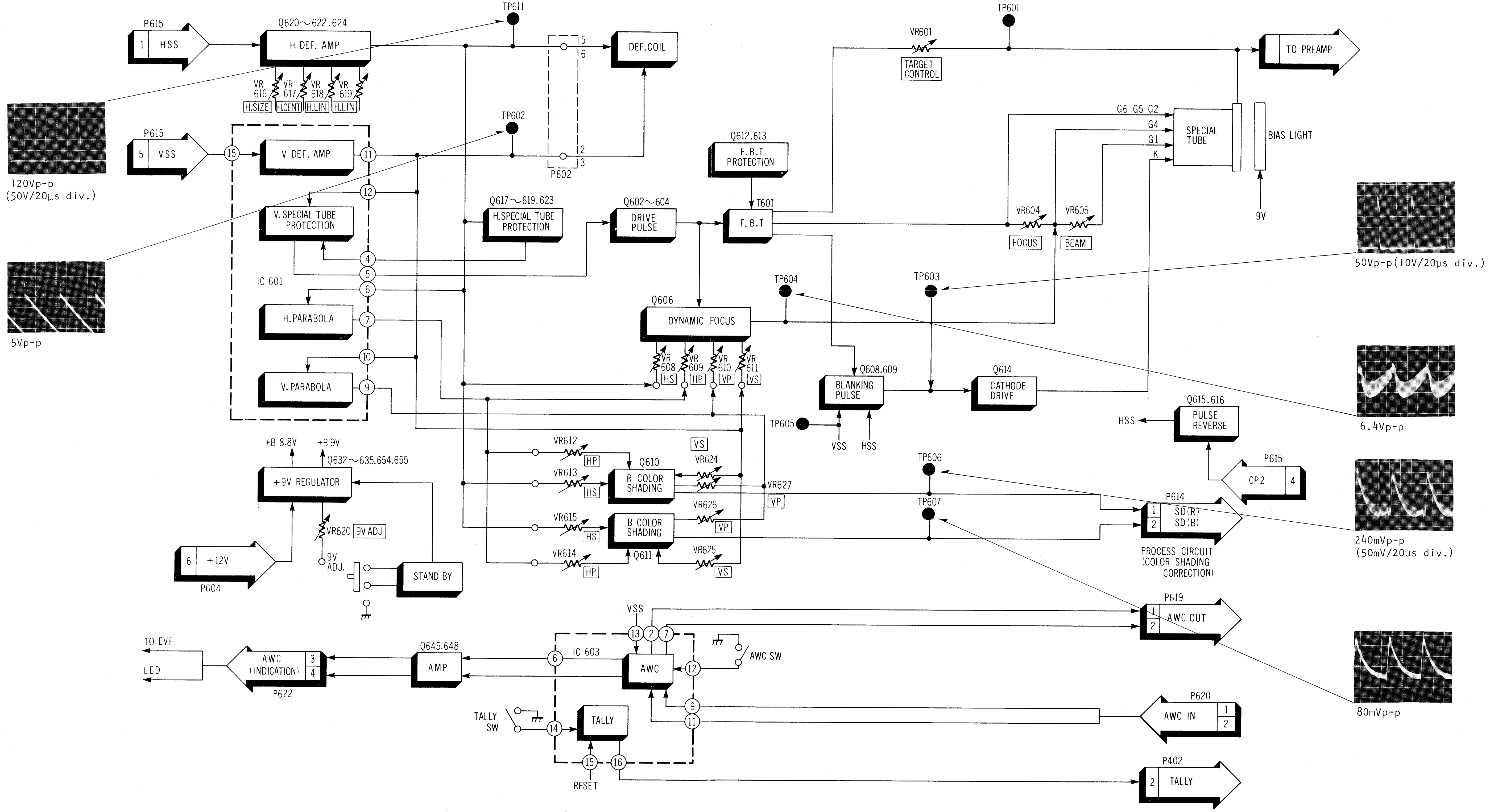
OVERALL BLOCK DIAGRAM


LUMINANCE SIGNAL PATH
CHROMINANCE SIGNAL PATH
SPECIAL TUBE
BIAS LIGHT
PRE AMP CIRCUIT
PRE AMP
IC201
Q201
DEFLECTION YOKE
P602
P601
Q620
Q621
Q622
Q624
TARGET CONTROL
VSS
V.DEF. AMP
IC601
H.DEF. AMP
HSS
VS
HS
V.SPECIAL TUBE PROTECTION
H.SPECIAL TUBE PROTECTION
Q617.618.619
623
Q612, Q613
F.B.T PROTECTION
DRIVE PULSE
Q602.603.604
F.B.T.
T601
HIGH VOLTAGE
D603
D604
HS
H.PARABOLA
HP
VS
V.PARABOLA
VP
HP HS VP VS
DYNAMIC FOCUS
Q606
SPECIAL TUBE SOCKET
Q608.609
FROM F.B.T.
BLANKING PULSE
HSS VSS
CATHODE DRIVE
Q614
PULSE REVERSE
Q615.616
CP2
HSS
HP HS
COLOR SHADING
Q610
B SHADING CORRECTION
ZOOM MOTOR
STAND BY
9V
12V
9V REGULATOR
Q632～635
Q654
HP HS
COLOR SHADING
Q611
R SHADING CORRECTION
MIC
AUDIO AMP
Q639, Q640
VCR
DEFLECTION/NTSC SIGNAL OUTPUT CIRCUIT
YE
Q301
AMP
IC 301
V.EDGE CORRECTION CIRCUIT
SC (3.58MHz)
IH DL
DL 301(A)
AMP
AMP
AMP
TO Q314 Q315 V. APERTURE
TO R&BSEP (V.EDGE)
IC302
3.58MHz TRAP
X301
VR305
INPUT GAIN
VR306
OB OFFSET
IC 304
LOW CHROMINANCE CLIP
SC1
SC2 HSS
BLK YC
R-Y
B-Y
MOD.
IC303
BLANKING HIGH CHROMA ELIMINATION
IH DELAY
DL 301(B)
AMP
PROCESS/ENCODER CIRCUIT
YH
FROM FADER CONTROL
APERTURE
AGC AMP
CLAMP
MIXER
IC 310
NTSC OUT
EVF OUT
VR315
AGC LEVEL
BLK CP2
CS
SC SC 9V WBL BLK VSS BSC CP2 CP1 WHD CS
SYNC. GEN.
IC306 X302
IC301 3.58MHz
BPF
Q302～307.310
AGC
AMP
CLAMP BLK CLIP
AMP
AMP
IC305
CP1 WHD WBLK
Q501～503 IC501
ALC& MANUAL IRIS
LENS
YE
LC302
L.P.F (0-3MHz)
Q314.315
AMP
DL 302
YH
V.APERTURE
L.P.F (0-0.5 MHz)
AMP
YL
L312.L313 C367 C368
Q323
V. EDGE
TP310
Q329
AMP
IC 308
R&B SEP
DET
R
DET
B
TP308
DL304 1H
Q331
MATRIX AMP
Q333
MATRIX AMP
Q317～322
γ+De γ AMP
IC 309
SHADING
LC305
LC304
LPF
LPF
TP311
TP312
IC309 Q334 Q335
GREEN EMPHASIS
TO AGC(IC306)
FADER CIRCUIT
FADER
Q401 Q410
～ ～
Q407 Q416
B-Y (TO IC303)
R-Y (TO IC303)
RESET
Q652 653
AMP
TALLY OUT
TALLY SW
TALLY
IC603
AWC
VSS AWC SW
Q705 706 708
IC703
AMP DET.
AMP DET.
Q701 702 707
IC703
AWC CIRCUIT
T.C.REMO CON.

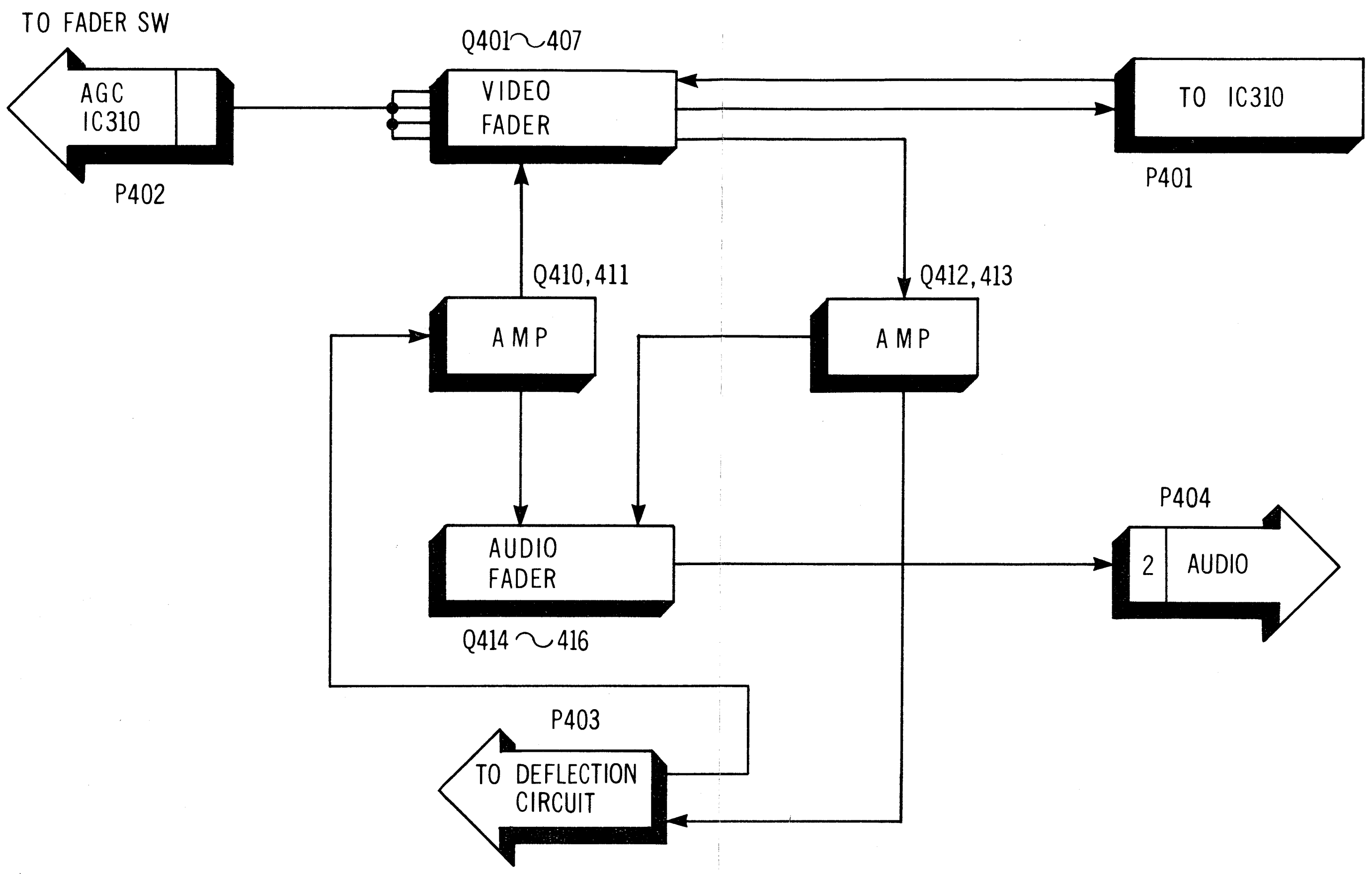
ENCODER BLOCK DIAGRAM


YE SIGNAL
Q301
AMP
IC301
V. EDGE CORRECTION
V. EDGE BAL.
VR301
IH DL
DL301(A)
S.C.(3.58MHz)
IC302
AMP
3.58MHz TRAP
VR302
X301
V. EDGE GAIN
V. EDGE CORRECTION SIGNAL
V. APERTURE
BLK
YC SIGNAL
COLOR LEVEL
R-Y SIGNAL
B-Y SIGNAL
IC303
MOD. CLAMP
HSS
SC2 (90° PHASE 3.58MHz)
SC1(3.58MHz)
HIGH CHROMA ELIMINATION
VR304
LOW CHROMA SHADING SUPP.
IC304
DL301(B)
IH DL
Q311
Q312
NTSC PED.
VR313
YH SIGNAL
DL303 0.15μs
P401
FADE CONTROL
P302
GAIN UP
AGC
AGC LEVEL
VR315
APERTURE DETECTOR CLAMP. AMP
CP2
BLANKING
PEDESTAL
PULSE SEP.
BLK
IC310
P303
NTSC OUT
EVF. CONNECTOR
Q328
BURST S.C
BLK
CP2
VR316
B.F. PHASE
C.S
LUMINANCE SIGNAL PATH
CHROMINANCE SIGNAL PATH

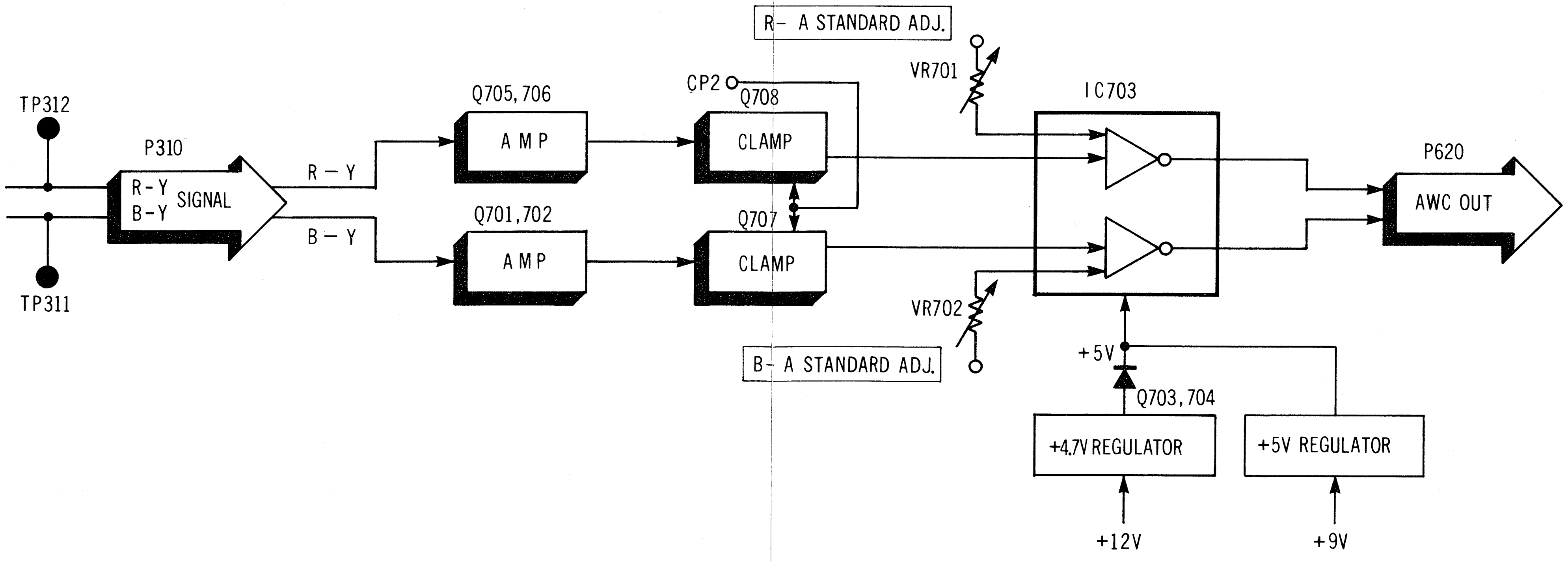
DEFLECTION BLOCK DIAGRAM


P615
1 HSS
Q620～622.624
H DEF. AMP
VR 616 H.SIZE
VR 617 H.CENT
VR 618 H.LIN
VR 619 H.LIN
TP611
DEF.COIL
5
6
2
3
P602
120Vp-p
(50V/20μs div.)
P615
5 VSS
15
V DEF. AMP
11
12
V. SPECIAL TUBE PROTECTION
4
5
6
IC 601
H.PARABOLA
7
10
V. PARABOLA
9
5Vp-p
TP602
Q617～619.623
H.SPECIAL TUBE PROTECTION
Q602～604
DRIVE PULSE
Q612.613
F.B.T PROTECTION
T601
F.B.T
Q606
DYNAMIC FOCUS
VR 608 HS
VR 609 HP
VR 610 VP
VR 611 VS
TP604
TP603
Q608.609
BLANKING PULSE
TP605
VSS
HSS
Q614
CATHODE DRIVE
VR601
TARGET CONTROL
TP601
TO PREAMP
G6 G5 G2
G4
G1
K
SPECIAL TUBE
BIAS LIGHT
9V
VR604 FOCUS
VR605 BEAM
50Vp-p(10V/20μs div.)
6.4Vp-p
Q615.616
HSS
PULSE REVERSE
P615
CP2 4
+B 8.8V
+B 9V
Q632～635.654.655
+9V REGULATOR
VR620 9V ADJ
9V ADJ.
6 +12V
P604
STAND BY
VR612 HP
VR613 HS
Q610
R COLOR SHADING
VR624 VS
VR627 VP
VR626 VP
VR615 HS
B COLOR SHADING
VR614 HP
Q611
VR625 VS
TP606
TP607
P614
1 SD(R)
2 SD(B)
PROCESS CIRCUIT (COLOR SHADING CORRECTION)
240mVp-p
(50mV/20μs div.)
80mVp-p
VSS
13
2
7
IC 603
AWC
12
AWC SW
P619
1 AWC OUT
2
TO EVF
LED
AWC (INDICATION)
3
4
P622
Q645.648
AMP
6
TALLY SW
14
TALLY
15
16
RESET
9
11
P620
AWC IN 1 2
P402
2 TALLY

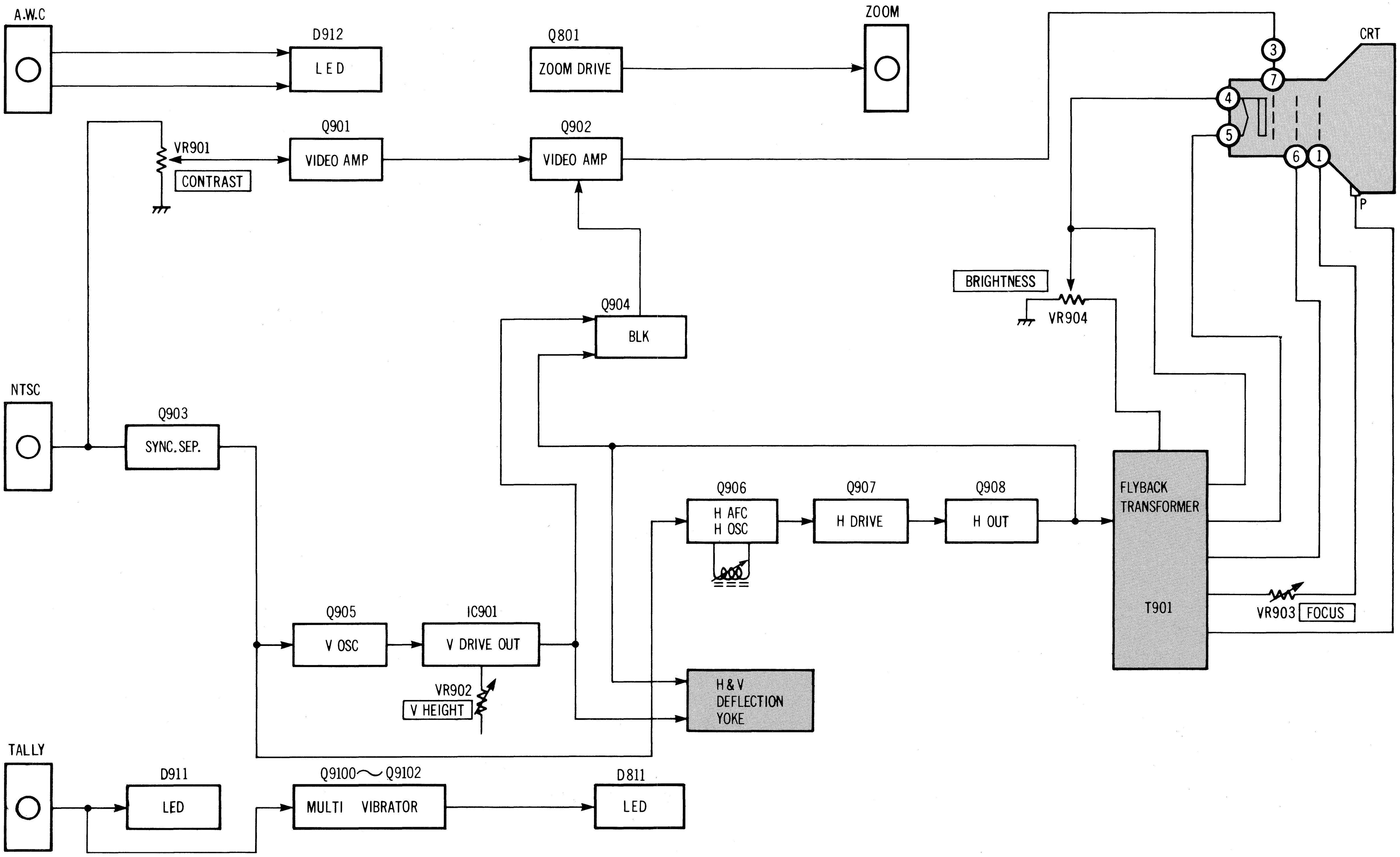
FADER BLOCK DIAGRAM


TO FADER SW
AGC
IC310
P402
Q401～407
VIDEO
FADER
TO IC310
P401
Q410, 411
AMP
Q412, 413
AMP
AUDIO
FADER
Q414～416
P404
2
AUDIO
P403
TO DEFLECTION
CIRCUIT

AWC BLOCK DIAGRAM


TP312
TP311
P310
R-Y
B-Y
SIGNAL
R – Y
B – Y
Q705, 706
AMP
Q701, 702
AMP
CP2
Q708
CLAMP
Q707
CLAMP
R- A STANDARD ADJ.
B- A STANDARD ADJ.
VR701
VR702
IC703
P620
AWC OUT
+5V
Q703, 704
+4.7V REGULATOR
+5V REGULATOR
+12V
+9V

ELECTRONIC VIEWFINDER BLOCK DIAGRAM


A.W.C
D912
LED
Q801
ZOOM DRIVE
ZOOM
CRT
3
7
4
5
6
1
P
VR901
CONTRAST
Q901
VIDEO AMP
Q902
VIDEO AMP
BRIGHTNESS
VR904
Q904
BLK
NTSC
Q903
SYNC.SEP.
Q906
H AFC
H OSC
Q907
H DRIVE
Q908
H OUT
FLYBACK
TRANSFORMER
T901
VR903
FOCUS
Q905
V OSC
IC901
V DRIVE OUT
VR902
V HEIGHT
H&V
DEFLECTION
YOKE
TALLY
D911
LED
Q9100～Q9102
MULTI VIBRATOR
D811
LED

PRODUCT SAFETY NOTE

The shaded area on this **block diagram** incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the **block diagram**

ORDER NO. VRD-8106-876

Service Manual

Color Video Camera

PK-801

Vol. 4

Schematic Diagrams

SPECIFICATIONS:

Power Source: DC 12V ± 10%
AC 120V ± 10%, 60Hz ± 0.5%
(with Power Supply Unit)
Power Consumption: DC 7.5W at 12V DC (Battery)
(with E.V.F) DC 0.7W at Standby
Special Tube System: 2/3″ frequency separation single tube system (built-in stripe filter)
Signal Carrier Frequency: 3.58MHz
Focus System: Electro-static type
Lens Mounting: Built-in zoom lens (not "C" mount)
Lens: 6:1 zoom lens with auto/manual iris control.
Auto zoom lens and macro construction
F: 1.4, f: 12mm—72mm,
d: 1.3m—infinity
Light Sensitivity: Minimum light intensity on optical image: 50 Lux (F: 1.4)
Optimum light intensity on optical image: 900 Lux
Video Output Level: 1.0Vp-p, 75Ω (M type coaxial connector)
(Standard NTSC signal)
Sync. System: Internal Sync: RS-170
Signal to Noise Ratio: More than 43dB
Horizontal Resolution: More than 240 lines
Color Temperature Control: 2 step switch (indoor, outdoor) & auto adjust

Microphone: Condenser Microphone
Audio Output Level: −20dB, Hi-impedance
Audio Output Impedance: High impedance (1KΩ)
External Microphone Input Impedance: 600Ω unbalanced
Electronic Viewfinder: Monochrome 1.5 inch CRT
Operating Temperature: 5°C to 35°C
Operating Humidity: 10% to 75%
Operating Position: Normal position only
Weight: Camera Head with E.V.F
6.3 lbs (with lens, 7ft. cable & shoulder pad/handle grip)
AC adaptor (option)
2.4 lbs
Demensions: Camera Head with E.V.F
7″(W) × 8″(H) × 13″(D)
177mm(W) × 210mm(H) × 318mm(D)
AC adaptor (option)
3″(W) × 3″(H) × 6″(D)
80mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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of Canada Limited
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Ontario, L4W 2T3

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Division of Matsushita Electric
of Puerto Rico, Inc.
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Victoria Industrial Park
Carolina, Puerto Rico 00630

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PRE-AMP SCHEMATIC DIAGRAM 4-1

PRE-AMP CIRCUIT BOARD (VEPW0023A) 4-1

PROCESS CIRCUIT BOARD (VEPW0060B) 4-2

PROCESS SCHEMATIC DIAGRAM 4-3

DEFLECTION SCHEMATIC DIAGRAM 4-4

DEFLECTION CIRCUIT BOARD (VEPW0061B) 4-4

AWC SCHEMATIC DIAGRAM 4-5

AWC CIRCUIT BOARD (VEPW0062) 4-5

FADER SCHEMATIC DIAGRAM 4-6

FADER CIRCUIT BOARD (VEPW0064) 4-6

AUTOMATIC LENS IRIS CONTROL SCHEMATIC DIAGRAM 4-6

AUTOMATIC LENS IRIS CONTROL CIRCUIT BOARD (VEPW0063) 4-7

REAR SIDE CIRCUIT BOARD (VEPW0065) 4-7

AWC SW CIRCUIT BOARD (VEPW0066) 4-7

REMO. CON. SW CIRCUIT BOARD (VEPW0067) 4-7

SPECIAL TUBE SOCKET CIRCUIT BOARD (VEPW0083) 4-7

BIAS LIGHT CIRCUIT BOARD 4-7

ELECTRONIC VIEWFINDER SCHEMATIC DIAGRAM 4-8

ELECTRONIC VIEWFINDER CIRCUIT BOARD 4-9

ZOOM SW CIRCUIT BOARD (VEPW0075) 4-9

EVF LED CIRCUIT BOARD (VEPW0073) 4-9

ELECTRONIC VIEWFINDER INTERCONNECTION SCHEMATIC DIAGRAM 4-10

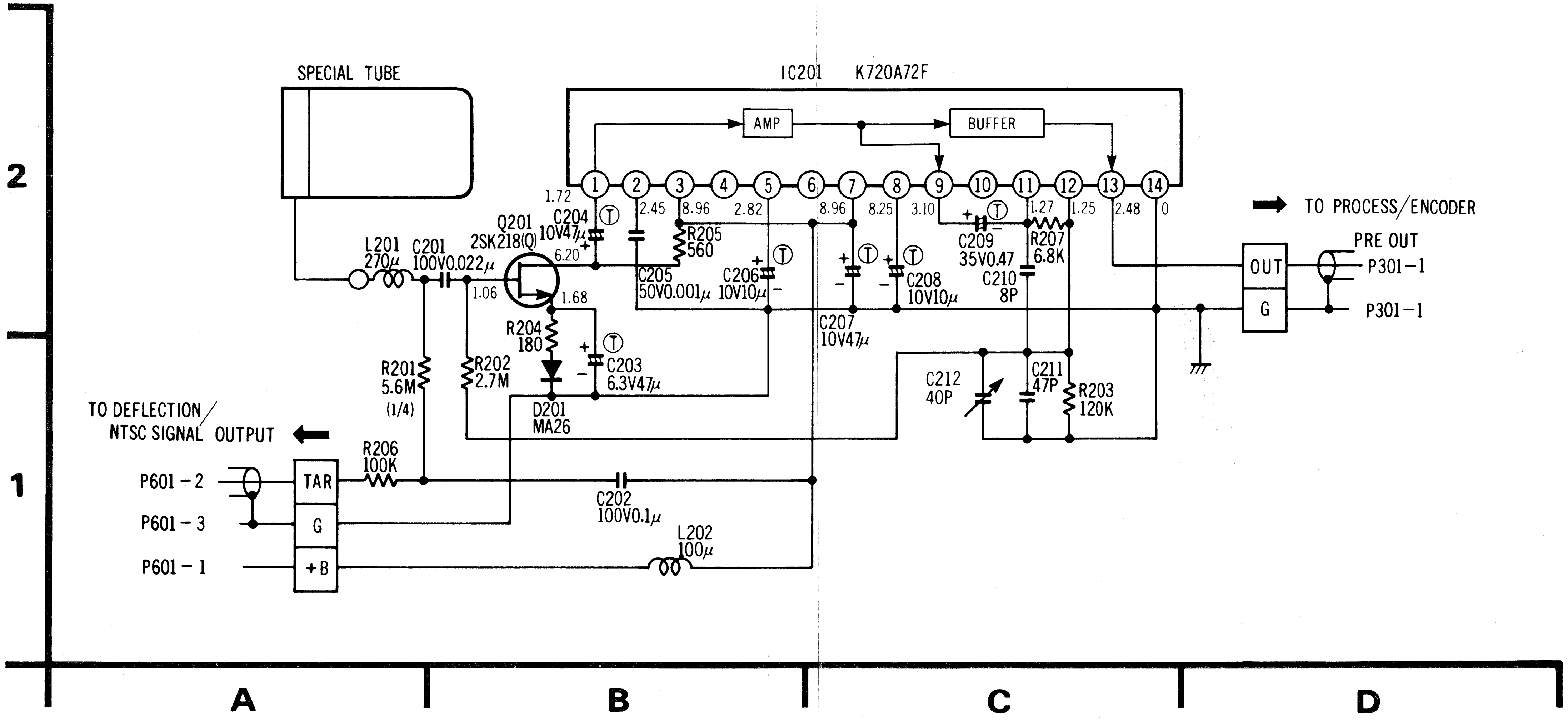
POWER SUPPLY SCHEMATIC DIAGRAM (OPTIONAL ACCESSORY) 4-10

POWER SUPPLY CIRCUIT BOARD (VEPK00468) 4-10

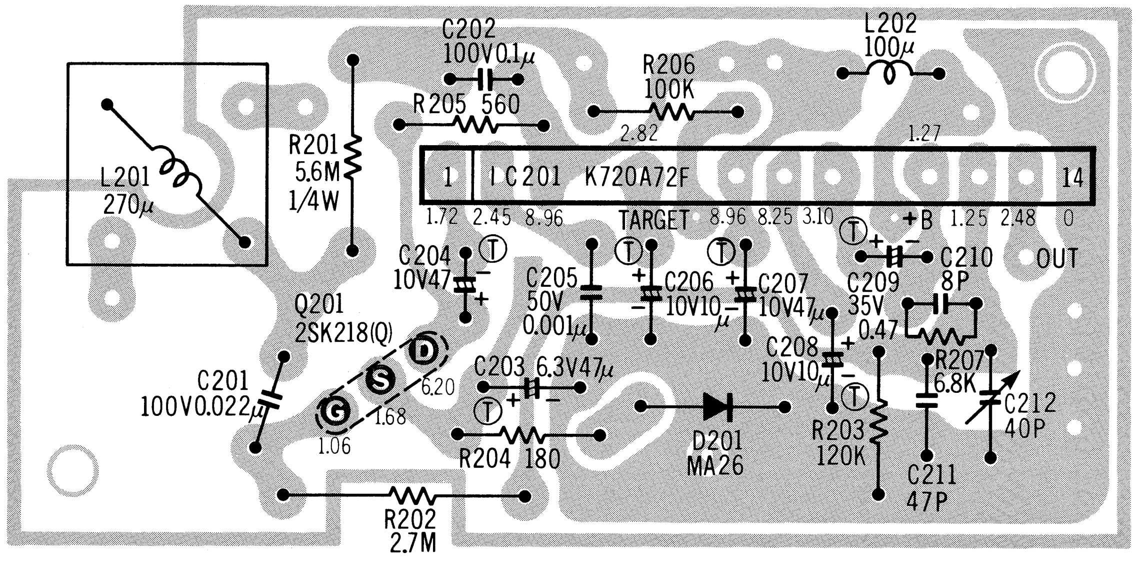
CIRCUIT BOARD LAYOUT 4-11

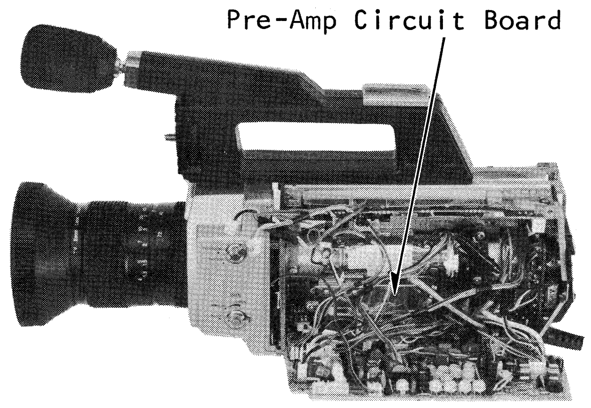
CAMERA UNIT INTERCONNECTION SCHEMATIC DIAGRAM 4-11

PRE-AMP SCHEMATIC DIAGRAM


SPECIAL TUBE
IC201 K720A72F
AMP
BUFFER
1 2 3 4 5 6 7 8 9 10 11 12 13 14
1.72
2.45
8.96
2.82
8.96
8.25
3.10
1.27
1.25
2.48
0
Q201 2SK218(Q)
C204 10V47μ
6.20
1.06
1.68
L201 270μ
C201 100V0.022μ
R205 560
C205 50V0.001μ
C206 10V10μ
C207 10V47μ
C208 10V10μ
C209 35V0.47
R207 6.8K
C210 8P
C211 47P
C212 40P
R203 120K
R204 180
D201 MA26
C203 6.3V47μ
R201 5.6M (1/4)
R202 2.7M
R206 100K
C202 100V0.1μ
L202 100μ
TO PROCESS/ENCODER
PRE OUT
OUT
G
P301-1
P301-1
TO DEFLECTION/NTSC SIGNAL OUTPUT
P601 - 2
P601 - 3
P601 - 1
TAR
G
+B
2
1
A
B
C
D

PRE-AMP CIRCUIT BOARD (VEPW0023A)


C202 100V0.1μ
L202 100μ
R206 100K
R205 560
2.82
1.27
R201 5.6M 1/4W
L201 270μ
IC201 K720A72F
1
14
1.72 2.45 8.96
TARGET 8.96 8.25 3.10
+B 1.25 2.48 0
OUT
C204 10V47
C205 50V 0.001μ
C206 10V10μ
C207 10V47μ
C209 35V 0.47
C210 8P
Q201 2SK218(Q)
D
S
G
6.20
1.68
1.06
C201 100V0.022μ
C203 6.3V47μ
C208 10V10μ
R207 6.8K
C212 40P
R204 180
D201 MA26
R203 120K
C211 47P
R202 2.7M


Pre-Amp Circuit Board

PROCESS CIRCUIT BOARD (VEPW0060B)

P301

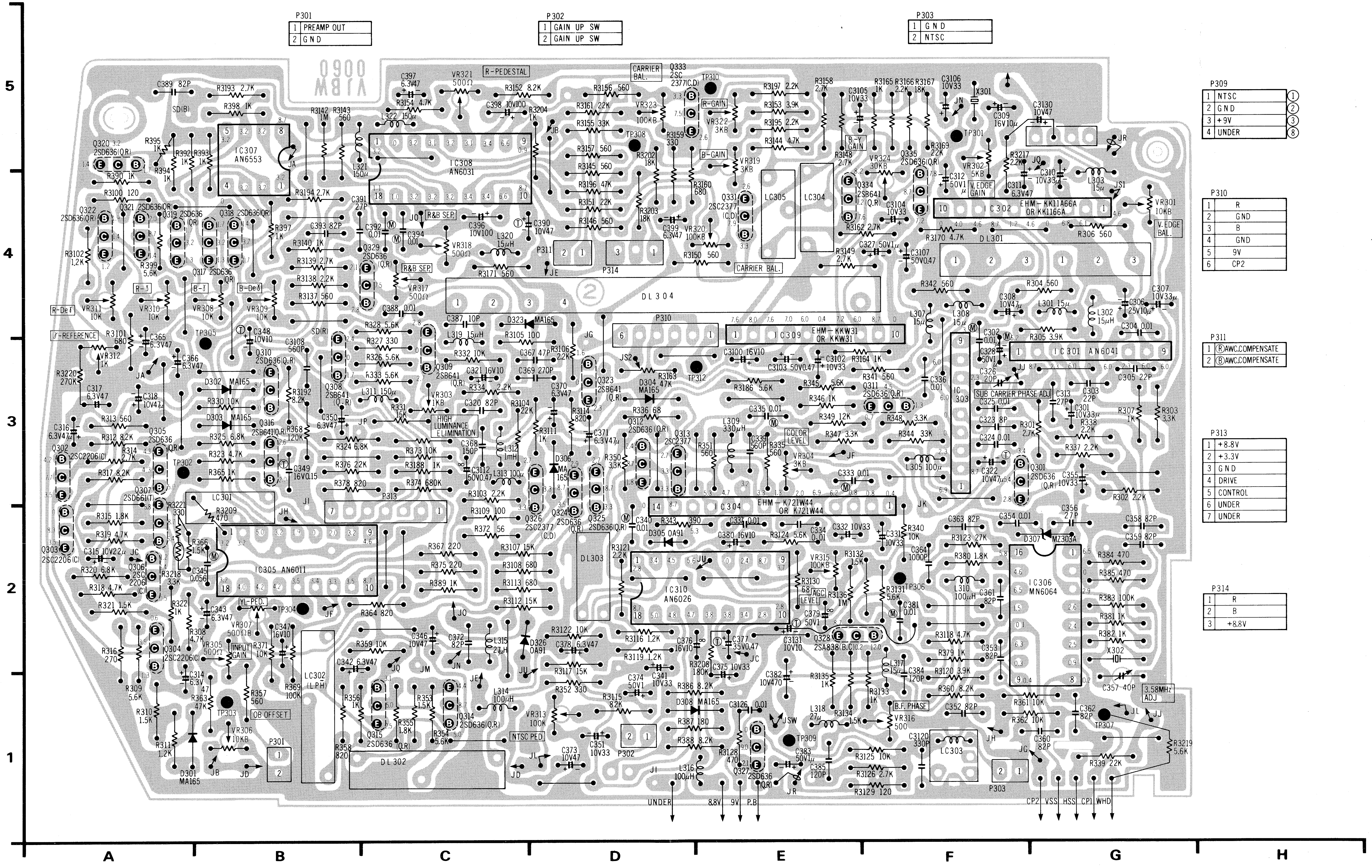
1	PREAMP OUT
2	GND

P302

1	GAIN UP SW
2	GAIN UP SW

P303

1	GND
2	NTSC


5
4
3
2
1
A
B
C
D
E
F
G
H
IC307 AN6553
IC308 AN6031
IC305 AN6011
IC310 AN6026
IC309 EHM-KKW31 OR KKW31
IC304 EHM-K721W44 OR K721W44
IC302 EHM-KK11A66A OR KK1166A
IC301 AN6041
IC303
IC306 MN6064
DL301
DL302
DL303
DL304
LC301
LC302 (LPH)
LC303
LC304
LC305
R-PEDESTAL
CARRIER BAL.
R-GAIN
B-GAIN
B-Y GAIN
V.EDGE GAIN
V.EDGE BAL.
R&B SEP.
R-Def
B-Def
R-δ
B-δ
γ-REFERENCE
HIGH LUMINANCE ELIMINATION
COLOR LEVEL
SUB CARRIER PHASE ADJ
YL-PED.
INPUT GAIN
OB OFFSET
NTSC PED
AGC LEVEL
B.F. PHASE
3.58MHz ADJ
UNDER
8.8V
9V
P.B
CP2
VSS
HSS
CP1
WHD

P309

1	NTSC	①
2	GND	②
3	+9V	③
4	UNDER	⑧

P310

1	R
2	GND
3	B
4	GND
5	9V
6	CP2

P311

1	Ⓡ AWC.COMPENSATE
2	Ⓑ AWC.COMPENSATE

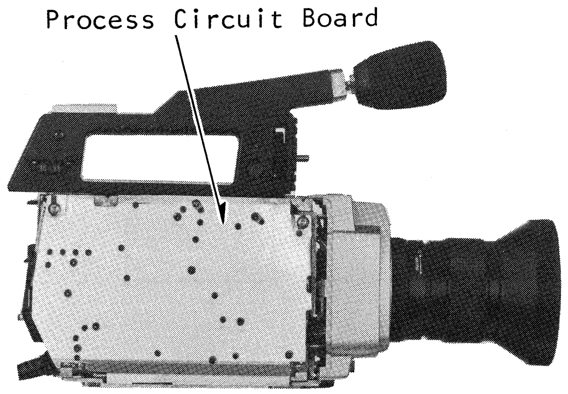
P313

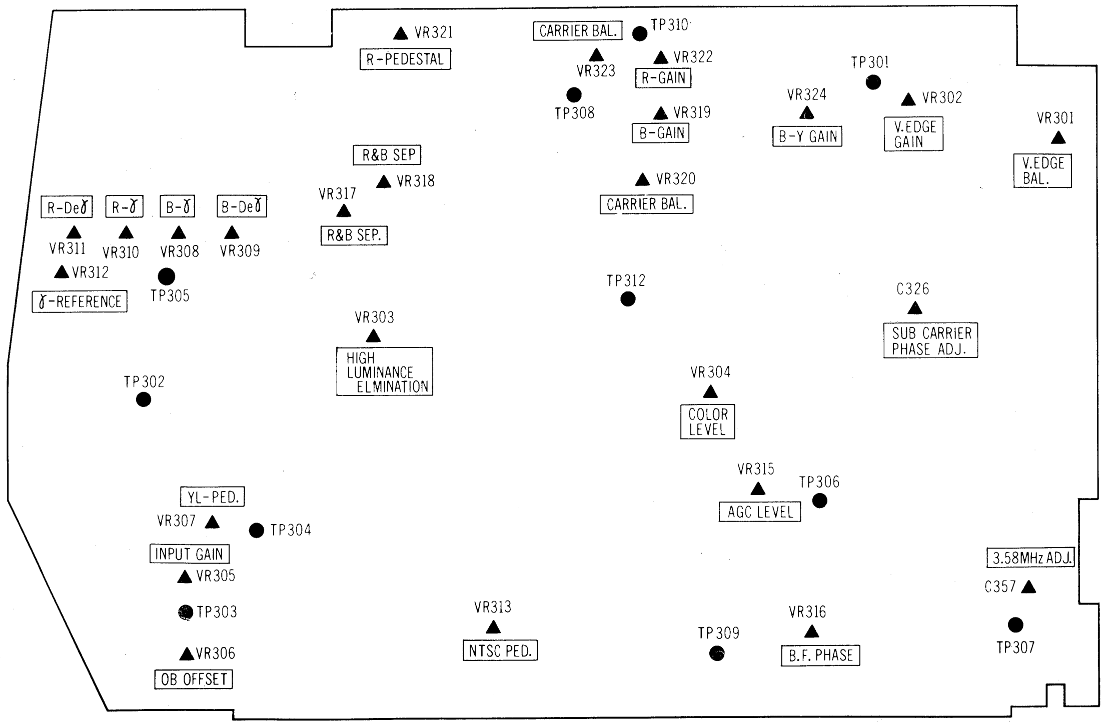
1	+8.8V
2	+3.3V
3	GND
4	DRIVE
5	CONTROL
6	UNDER
7	UNDER

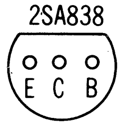
P314

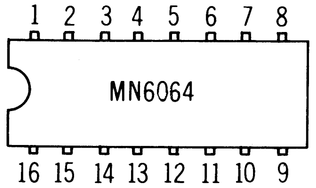
1	R
2	B
3	+8.8V

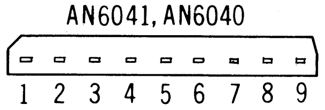
IC301	G-3
IC302	G-4
IC303	F-3
IC304	E-2
IC305	B-2
IC306	G-2
IC307	B-5
IC308	C-4
IC309	E-4
IC310	E-2
Q301	F-3
Q302	A-3
Q303	A-2
Q304	A-2
Q305	A-3
Q306	A-2
Q307	A-2
Q308	B-3
Q309	C-3
Q310	B-3
Q311	F-3
Q312	D-3
Q313	D-3
Q314	C-1
Q315	C-1
Q316	B-3
Q317	B-4
Q318	B-4
Q319	A-4
Q320	A-5
Q321	A-4
Q322	A-4
Q323	D-3
Q324	D-3
Q325	D-3
Q326	D-3
Q327	E-1
Q328	E-2
Q329	C-4
Q331	E-4
Q333	D-5
Q334	E-4
Q335	F-4
VR301	G-4
VR302	F-5
VR303	C-3
VR304	E-3
VR305	B-2
VR306	B-1
VR307	B-2
VR308	B-4
VR309	B-4
VR310	A-4
VR311	A-4
VR312	A-3
VR313	D-1
VR315	E-2
VR316	F-1
VR317	C-4
VR318	C-4
VR319	E-4
VR320	E-4
VR321	C-5
VR322	E-5
VR323	D-5
VR324	F-4

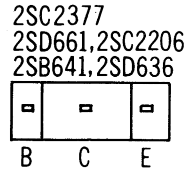

Process Circuit Board

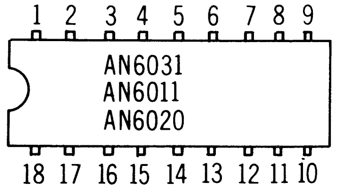

VR321
R-PEDESTAL
CARRIER BAL.
TP310
VR323
VR322
R-GAIN
TP308
VR319
B-GAIN
TP301
VR324
B-Y GAIN
VR302
V.EDGE GAIN
VR301
V.EDGE BAL.
R&B SEP
VR318
VR317
R&B SEP.
VR320
CARRIER BAL.
R-Deγ
R-γ
B-γ
B-Deγ
VR311
VR310
VR308
VR309
VR312
γ-REFERENCE
TP305
TP312
C326
SUB CARRIER PHASE ADJ.
VR303
HIGH LUMINANCE ELMINATION
TP302
VR304
COLOR LEVEL
VR315
AGC LEVEL
TP306
YL-PED.
VR307
TP304
INPUT GAIN
VR305
TP303
VR306
OB OFFSET
VR313
NTSC PED.
TP309
VR316
B.F. PHASE
3.58MHz ADJ.
C357
TP307

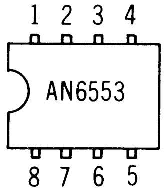


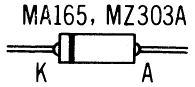

1 2 3 4 5 6 7 8
MN6064
16 15 14 13 12 11 10 9


AN6041, AN6040
1 2 3 4 5 6 7 8 9

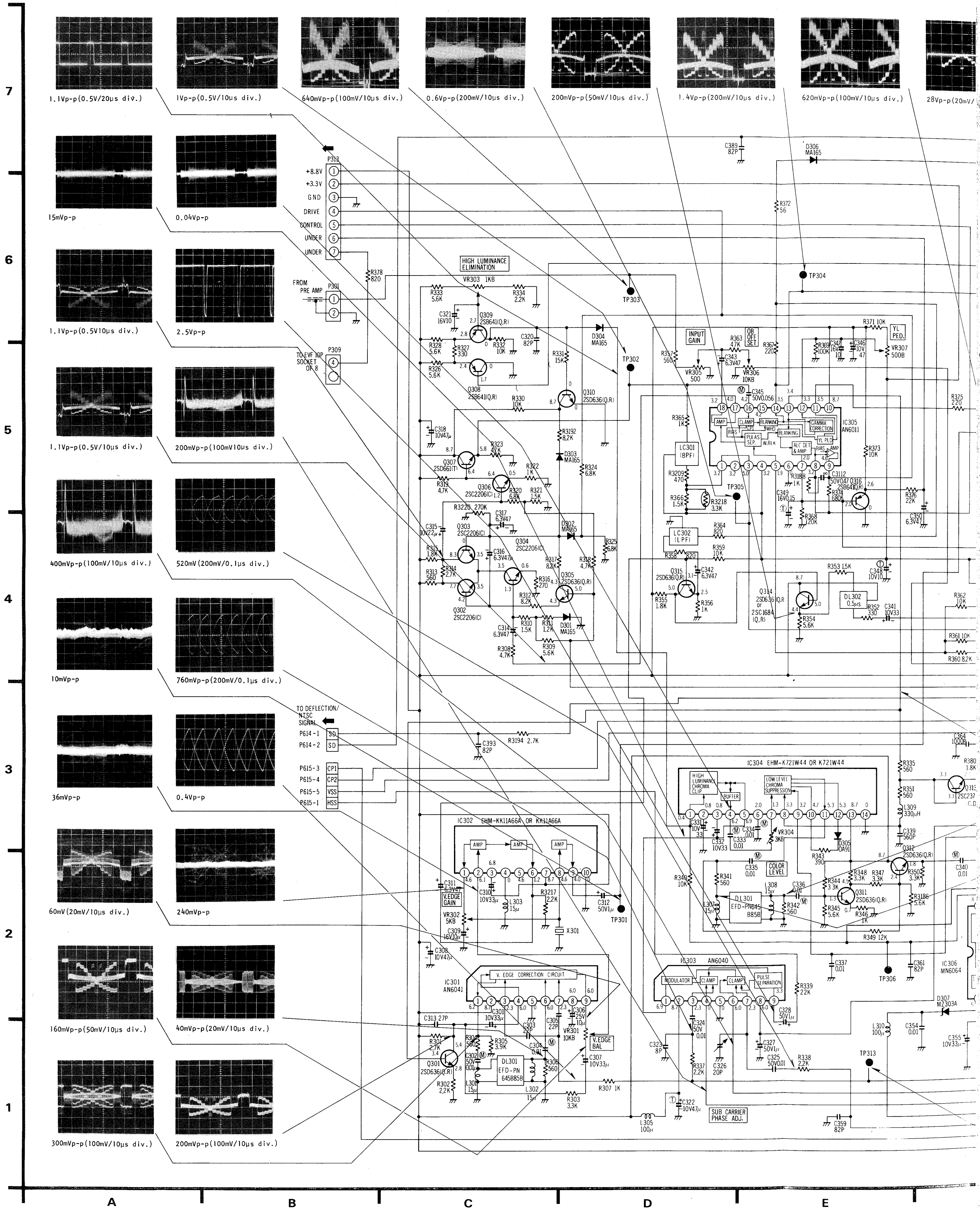

2SC2377
2SD661, 2SC2206
2SB641, 2SD636
B C E


1 2 3 4 5 6 7 8 9
AN6031
AN6011
AN6020
18 17 16 15 14 13 12 11 10

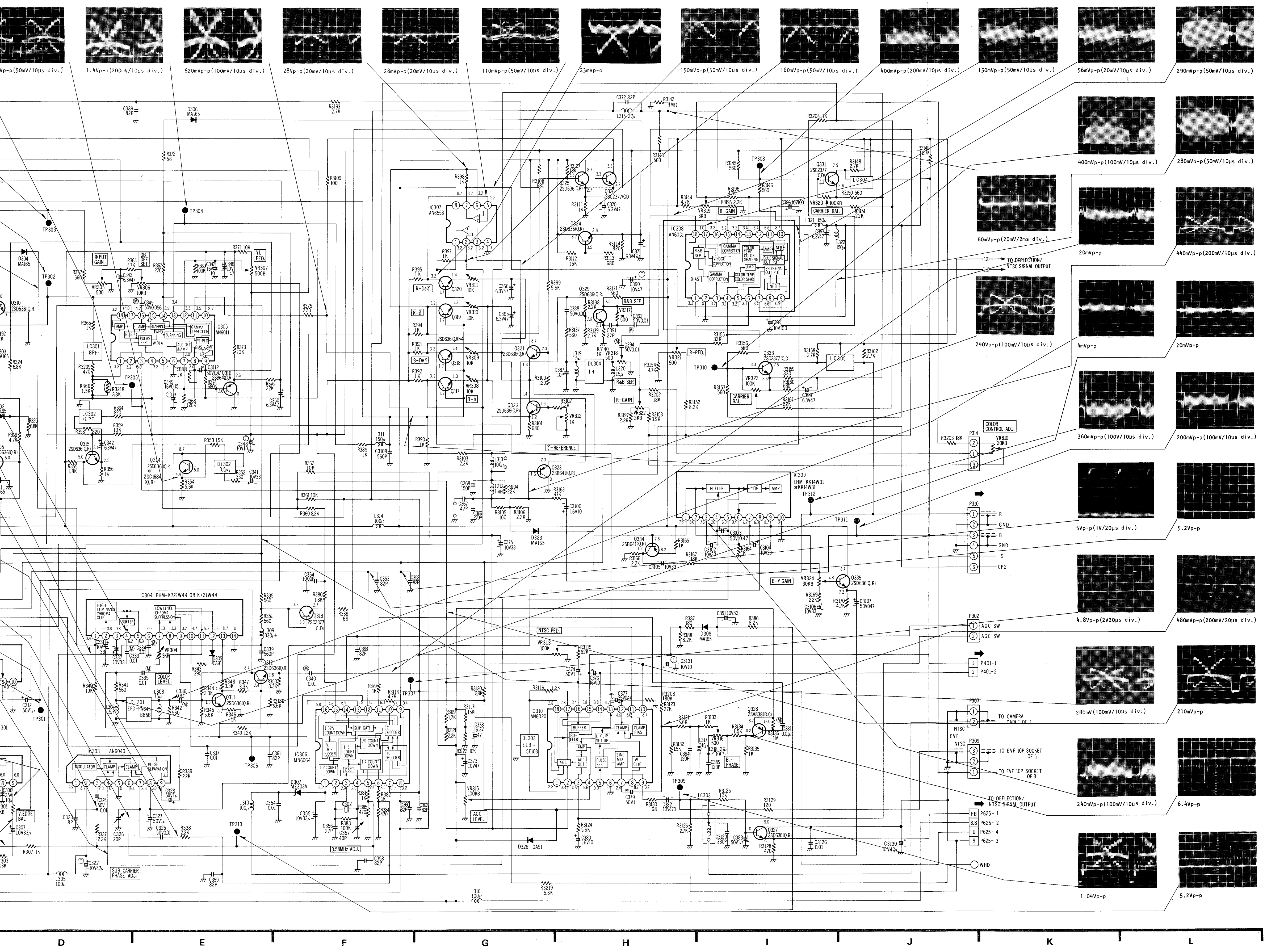

1 2 3 4
AN6553
8 7 6 5


MA165, MZ303A
K
A

PROCESS SCHEMATIC DIAGRAM


7
6
5
4
3
2
1
A
B
C
D
E
1.1Vp-p(0.5V/20μs div.)
1Vp-p(0.5V/10μs div.)
640mVp-p(100mV/10μs div.)
0.6Vp-p(200mV/10μs div.)
200mVp-p(50mV/10μs div.)
1.4Vp-p(200mV/10μs div.)
620mVp-p(100mV/10μs div.)
15mVp-p
0.04Vp-p
1.1Vp-p(0.5V10μs div.)
2.5Vp-p
1.1Vp-p(0.5V/10μs div.)
200mVp-p(100mV10μs div.)
400mVp-p(100mV/10μs div.)
520mV(200mV/0.1μs div.)
10mVp-p
760mVp-p(200mV/0.1μs div.)
36mVp-p
0.4Vp-p
60mV(20mV/10μs div.)
240mVp-p
160mVp-p(50mV/10μs div.)
40mVp-p(20mV/10μs div.)
300mVp-p(100mV/10μs div.)
200mVp-p(100mV/10μs div.)
P312
+8.8V
+3.3V
GND
DRIVE
CONTROL
UNDER
UNDER
FROM PRE AMP
P361
TO EVF 10P SOCKET
P309
HIGH LUMINANCE ELIMINATION
TP303
TP304
TP302
TP305
INPUT GAIN
IC305 AN6011
GAMMA CORRECTION
LC301 (BPF)
LC302 (LPF)
DL302
TO DEFLECTION/NTSC SIGNAL
P614-1
P614-2
P615-3
P615-4
P615-5
P615-1
IC302 EHM-KK11A66A OR KK31A66A
IC304 EHM-K721W44 OR K721W44
V.EDGE GAIN
COLOR LEVEL
DL301
TP301
X301
IC301 AN6041
V. EDGE CORRECTION CIRCUIT
V.EDGE BAL.
IC303 AN6040
MODULATOR
CLAMP
PULSE SEPARATION
SUB CARRIER PHASE ADJ.
TP306
IC306 MN6064
TP313

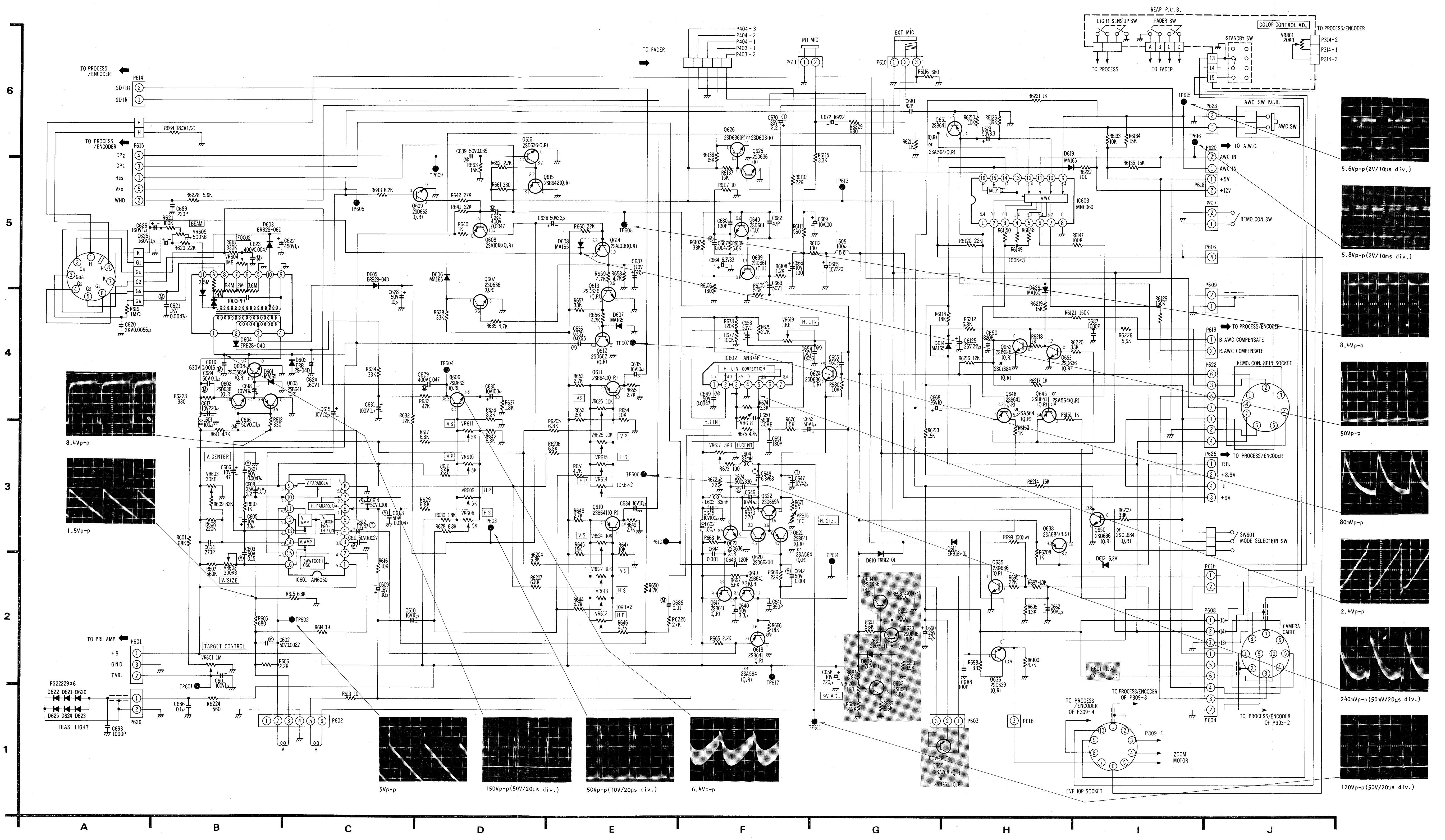
AM


Vp-p(50mV/10µs div.)
1.4Vp-p(200mV/10µs div.)
620mVp-p(100mV/10µs div.)
28Vp-p(20mV/10µs div.)
28mVp-p(20mV/10µs div.)
110mVp-p(50mV/10µs div.)
23mVp-p
150mVp-p(50mV/10µs div.)
160mVp-p(50mV/10µs div.)
400mVp-p(200mV/10µs div.)
150mVp-p(50mV/10µs div.)
56mVp-p(20mV/10µs div.)
290mVp-p(50mV/10µs div.)
400mVp-p(100mV/10µs div.)
280mVp-p(50mV/10µs div.)
60mVp-p(20mV/2ms div.)
20mVp-p
440mVp-p(200mV/10µs div.)
240Vp-p(100mV/10µs div.)
4mVp-p
20mVp-p
360mVp-p(100V/10µs div.)
200mVp-p(100mV/10µs div.)
5Vp-p(1V/20µs div.)
5.2Vp-p
4.8Vp-p(2V20µs div.)
480mVp-p(200mV/20µs div.)
280mV(100mV/10µs div.)
210mVp-p
240mVp-p(100mV/10µs div.)
6.4Vp-p
1.04Vp-p
5.2Vp-p
IC307 AN6553
IC308 AN6031
IC305 AN6011
IC304 EHM-K72W44 OR K72W44
IC303 AN6040
IC306 MN6064
IC310 AN6020
IC309 EHM-KK14W31 orKK14W31
INPUT GAIN
OB OFF SET
YL PED.
R-DEγ
R-γ
B-DEγ
B-γ
γ-REFERENCE
R&B SEP.
R-GAIN
B-GAIN
CARRIER BAL.
R-PED.
NTSC PED.
B-Y GAIN
COLOR LEVEL
AGC LEVEL
B.F. PHASE
V.EDGE BAL
SUB CARRIER PHASE ADJ.
3.58MHz ADJ.
TO DEFLECTION/NTSC SIGNAL OUTPUT
COLOR CONTROL ADJ.
P314
VR810 20KB
P310
R
GND
B
GND
9
CP2
P302
AGC SW
AGC SW
P401-1
P401-2
P303
TO CAMERA CABLE OF 1
NTSC
EVF
P309
TO EVF 10P SOCKET OF 1
TO EVF 10P SOCKET OF 3
PB P625-1
B.B P625-2
U P625-4
9 P625-3
WHD
TP301
TP302
TP303
TP304
TP305
TP306
TP307
TP308
TP309
TP310
TP311
TP312
TP313
D
E
F
G
H
I
J
K
L

VR301	V. EDGE BAL.	D-1
VR302	V. EDGE GAIN	C-2
VR303	HIGH LUMINANCE ELIMINATION	C-6
VR304	COLOR LEVEL	E-3
VR305	INPUT GAIN	D-5
VR306	OB OFFSET	E-5
VR307	YL PEDESTAL	E-5
VR308	B - γ	G-5
VR309	B - DE γ	G-5
VR310	R - γ	G-5
VR311	R - DE γ	G-5
VR312	γ - REFERENCE	H-4
VR313	NTSC PED	H-3
VR315	AGC LEVEL	G-2
VR316	B.F. PHASE	I-2
VR317	R&B SEP.	H-5
VR318	R&B SEP.	H-5
VR319	B - GAIN	I-6
VR320	CARRIER BAL	I-6
VR321	R - PEDESTAL	H-5
VR322	R - GAIN	H-4
VR323	CARRIER BAL	I-5
VR324	B-Y GAIN	I-3
C326	SUB CARRIER PHASE ADJ.	D-1
C357	3.58MHz ADJ	F-1

DEFLECTION SCHEMATIC DIAGRAM

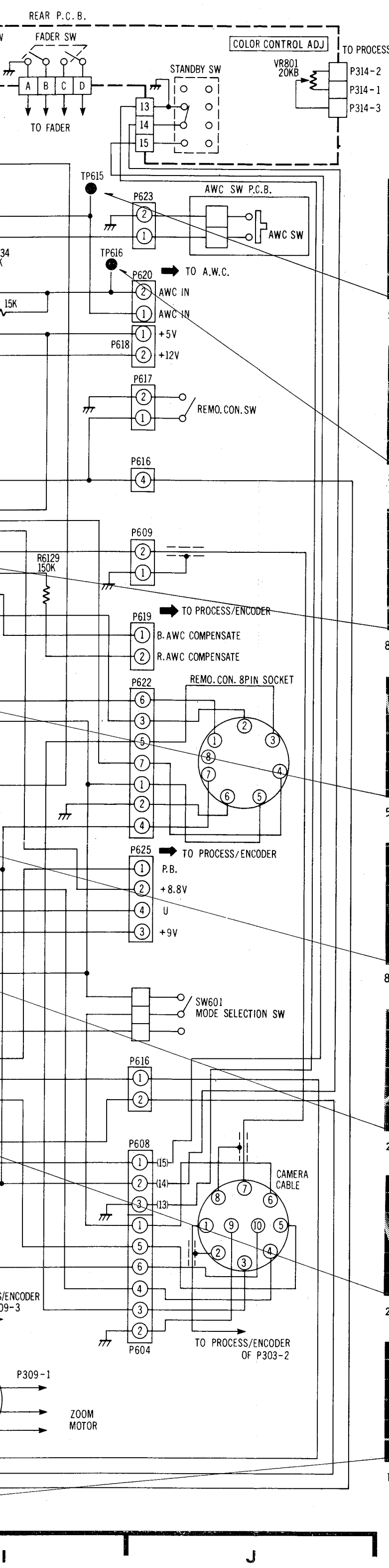
VR601	TARGET CONTROL	B-2
VR602	V. SIZE	B-2
VR603	V. CENTER	B-3
VR604	FOCUS	B-5
VR605	BEAM	C-5
VR606	HS	D-2
VR607	HP	D-2
VR608	HS	D-3
VR609	HP	D-3
VR610	VP	D-3
VR611	VS	D-3
VR612	HP	E-2
VR613	HS	E-2
VR616	H. SIZE	F-3
VR617	H. CENTER	F-3
VR618	H. LIN	F-4
VR619	H. LIN	F-4
VR620	9V ADJ	G-2

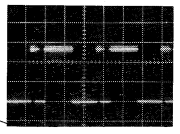

TO PROCESS /ENCODER
TO FADER
INT MIC
EXT MIC
REAR P.C.B.
LIGHT SENS UP SW
FADER SW
COLOR CONTROL ADJ
TO PROCESS/ENCODER
STANDBY SW
TO PROCESS
AWC SW P.C.B.
AWC SW
TO A.W.C.
REMO. CON. SW
IC603 MN6069
IC602 AN374P
H. LIN CORRECTION
IC601 AN6050
V. PARABOLA
H. PARABOLA
SAWTOOTH OSC
V. AMP
H. AMP
TARGET CONTROL
TO PRE AMP
BIAS LIGHT
REMO. CON. 8PIN SOCKET
SW601 MODE SELECTION SW
CAMERA CABLE
EVF 10P SOCKET
ZOOM MOTOR
F601 1.5A
POWER Tr. Q655 2SA768 (Q.R) or 2SB761 (Q.R)
8.4Vp-p
1.5Vp-p
5Vp-p
150Vp-p(50V/20μs div.)
50Vp-p(10V/20μs div.)
6.4Vp-p
5.6Vp-p(2V/10μs div.)
5.8Vp-p(2V/10ms div.)
8.4Vp-p
50Vp-p
80mVp-p
2.4Vp-p
240mVp-p(50mV/20μs div.)
120Vp-p(50V/20μs div.)
1
2
3
4
5
6
A
B
C
D
E
F
G
H
I
J

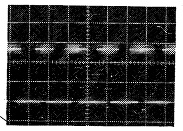
PRODUCT SAFETY NOTE

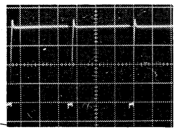
The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

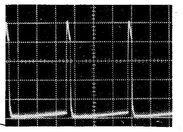
DEFLECTION CIRCUIT BOARD (VEPW0061B)

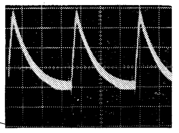

REAR P.C.B.
FADER SW
TO FADER
STANDBY SW
COLOR CONTROL ADJ
VR801 20KB
TO PROCESS/ENCODER
P314-2
P314-1
P314-3
TP615
TP616
P623
AWC SW P.C.B.
AWC SW
P620
TO A.W.C.
AWC IN
AWC IN
P618
+5V
+12V
P617
REMO.CON.SW
P616
P609
R6129 150K
P619
TO PROCESS/ENCODER
B.AWC COMPENSATE
R.AWC COMPENSATE
P622
REMO.CON. 8PIN SOCKET
P625
TO PROCESS/ENCODER
P.B.
+8.8V
U
+9V
SW601 MODE SELECTION SW
P608
CAMERA CABLE
P604
TO PROCESS/ENCODER OF P303-2
P309-1
ZOOM MOTOR
I
J

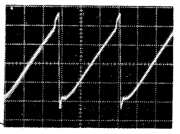

5.6Vp-p(2V/10µs div.)

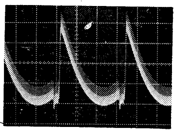

5.8Vp-p(2V/10ms div.)

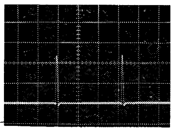

8.4Vp-p


50Vp-p


80mVp-p


2.4Vp-p


240mVp-p(50mV/20µs div.)


120Vp-p(50V/20µs div.)

P601

1	+9V
2	TARGET CONTROL
3	GND

P602

1	THERMISTOR
2	V.DEF. COIL(L)
3	V.DEF. COIL(H)
4	GND
5	H.DEF. COIL(L)
6	H.DEF. COIL(H)

P603

1	Q655(C)
2	Q655(E)
3	Q655(B)

P604

1	REMO.CON. OUT
2	GND
3	TC REMO.CON.
4	RESET IN
5	STANDBY OUT
6	+12V

P608

1	+12V
2	⑤
3	GND

P609

1	GND
2	AUDIO OUT

P610

1	GND
2	EXT. MIC
3	GND

P611

1	GND
2	MIC. IN

P614

1	SD(B)
2	SD(R)

P615

1	Hss
2	W.H.D.
3	CP1
4	CP2
5	Vss

P616

1	REMO.CON. LED	⑥
2	REC LED	⑦
3	AWC(OK)	⑩
4	AWC(OK)	⑨

P617

1	REMO. CON. SW
2	GND

P618

1	+5V
2	+12V

P619

1	Ⓑ AWC COMPENSATE
2	Ⓡ AWC COMPENSATE

P620

1	AWC IN	(TP615)
2	AWC IN	(TP616)

P622

1	W.H.D. IN	⑤
2	GND	⑥
3	REMO. CON. IN	②
4	STANDBY +12V	⑦
5	TC REMO. CON	③
6	+9V	①
7	W.H.D. OUT	④

P623

1	GND
2	AWC SIGNAL

P624

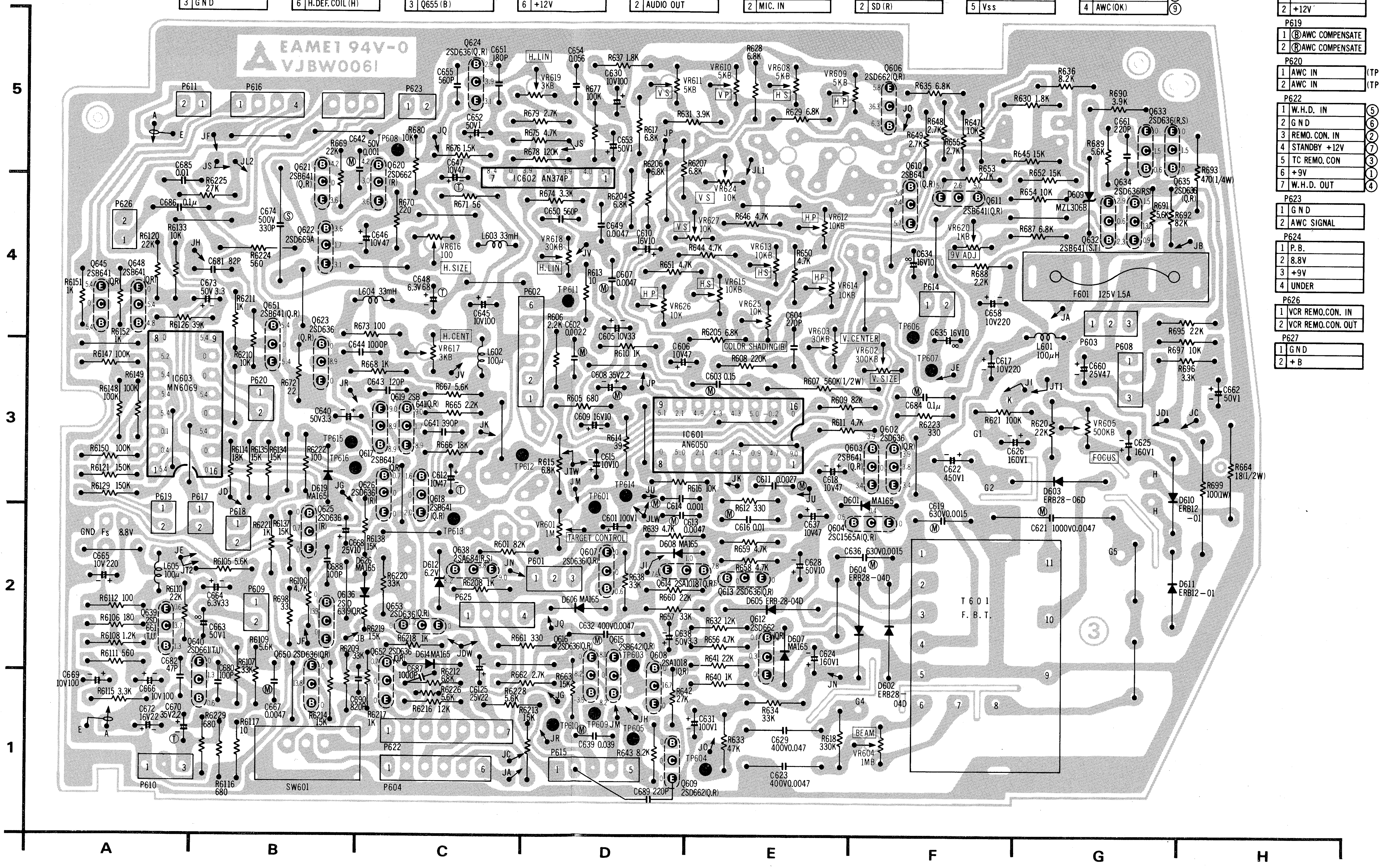
1	P.B.
2	8.8V
3	+9V
4	UNDER

P626

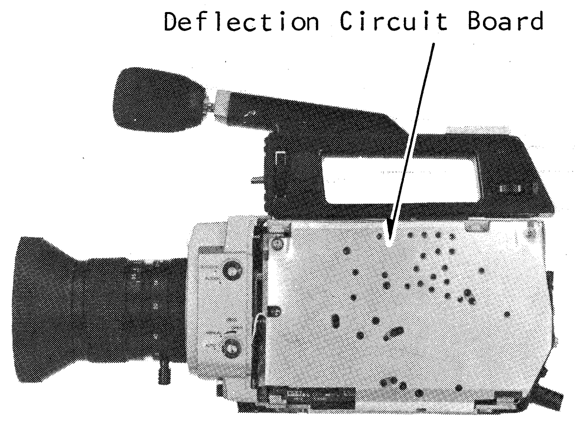
1	VCR REMO.CON. IN
2	VCR REMO.CON. OUT

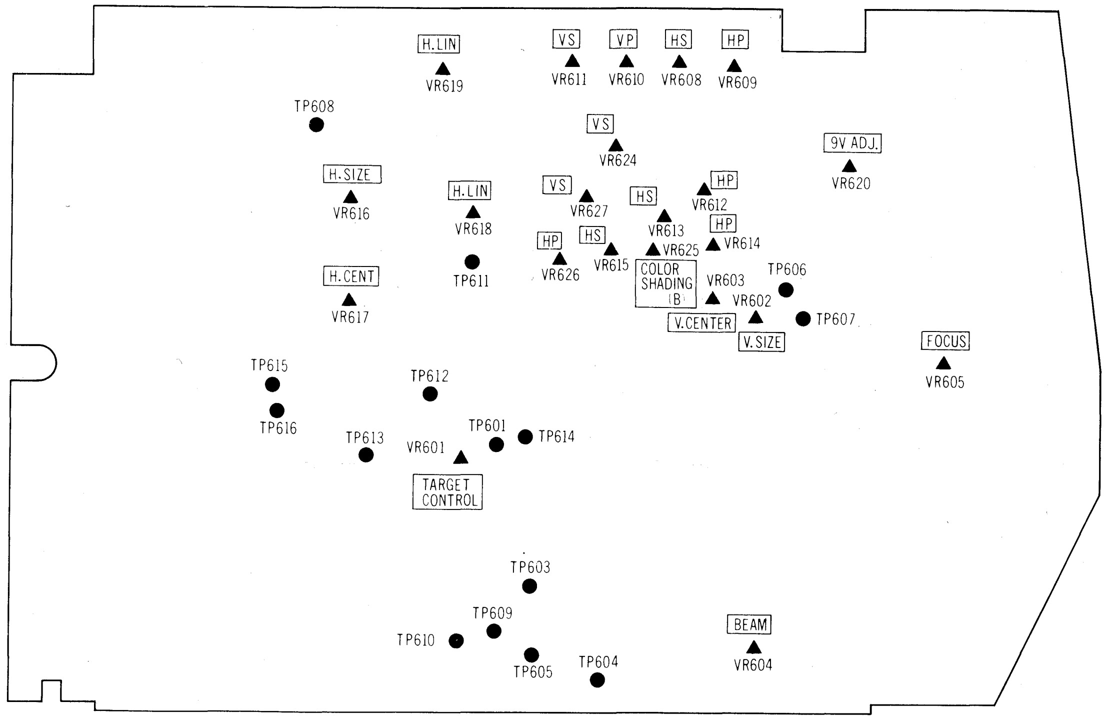
P627

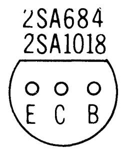
1	GND
2	+B

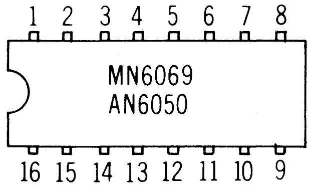

EAME1 94V-0
VJBW0061
IC601 AN6050
IC602 AN374P
IC603 MN6069
T601 F.B.T.
F601 125V 1.5A
H.LIN
H.SIZE
H.CENT
V.CENTER
V.SIZE
COLOR SHADING
TARGET CONTROL
FOCUS
BEAM
9V ADJ
SW601
P601
P602
P604
P610
P611
P616
P622
P623
P625
5
4
3
2
1
A
B
C
D
E
F
G
H

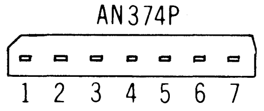
IC601	E-3
IC602	D-4
IC603	A-3
Q601	D-2
Q602	F-3
Q603	F-3
Q604	F-2
Q605	F-5
Q606	F-5
Q607	D-2
Q608	D-1
Q609	D-1
Q610	F-4
Q611	F-4
Q612	E-2
Q613	E-2
Q614	D-2
Q615	D-1
Q616	D-1
Q617	C-3
Q618	C-3
Q619	C-3
Q620	C-4
Q621	B-4
Q622	B-4
Q623	B-3
Q624	C-5
Q625	B-2
Q626	C-3
Q632	G-4
Q633	G-5
Q634	G-4
Q635	G-5
Q636	B-2
Q638	C-2
Q639	A-2
Q640	B-1
Q645	A-4
Q648	A-4
Q650	B-1
Q651	B-3
Q652	C-1
Q653	C-2
VR601	D-2
VR602	F-3
VR603	E-3
VR604	F-1
VR605	G-3
VR606	E-5
VR607	F-5
VR608	E-5
VR609	F-5
VR610	E-5
VR611	D-5
VR612	E-4
VR613	E-4
VR614	E-4
VR615	E-4
VR616	C-4
VR617	C-3
VR618	D-4
VR619	D-5
VR620	F-4
VR624	E-5
VR625	E-4
VR626	D-4
VR627	E-4

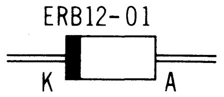

Deflection Circuit Board

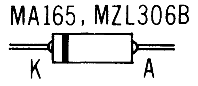

H.LIN
VR619
VS
VR611
VP
VR610
HS
VR608
HP
VR609
TP608
VS
VR624
9V ADJ.
VR620
H.SIZE
VR616
H.LIN
VR618
VS
VR627
HS
VR613
HP
VR612
HP
VR614
HP
VR626
HS
VR615
VR625
TP611
COLOR SHADING (B)
VR603
VR602
TP606
TP607
H.CENT
VR617
V.CENTER
V.SIZE
FOCUS
VR605
TP615
TP616
TP612
TP613
VR601
TP601
TP614
TARGET CONTROL
TP603
TP609
TP610
TP605
TP604
BEAM
VR604

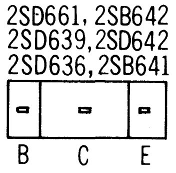

2SA684
2SA1018
E C B

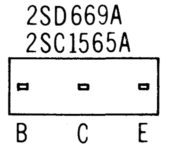

1 2 3 4 5 6 7 8
MN6069
AN6050
16 15 14 13 12 11 10 9

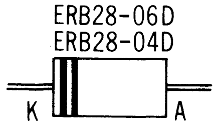

AN374P
1 2 3 4 5 6 7



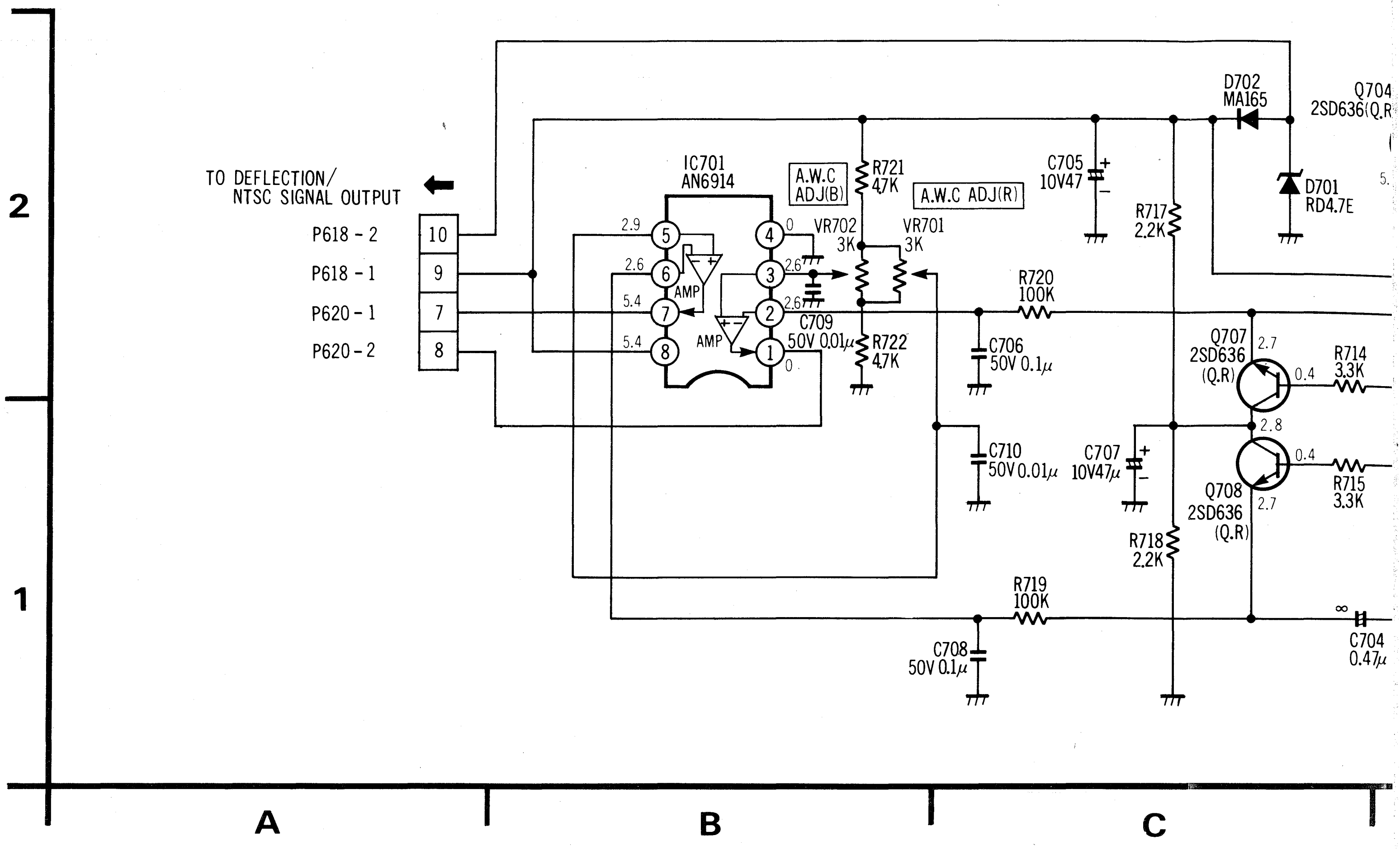

MA165, MZL306B
K
A


2SD661, 2SB642
2SD639, 2SD642
2SD636, 2SB641
B C E

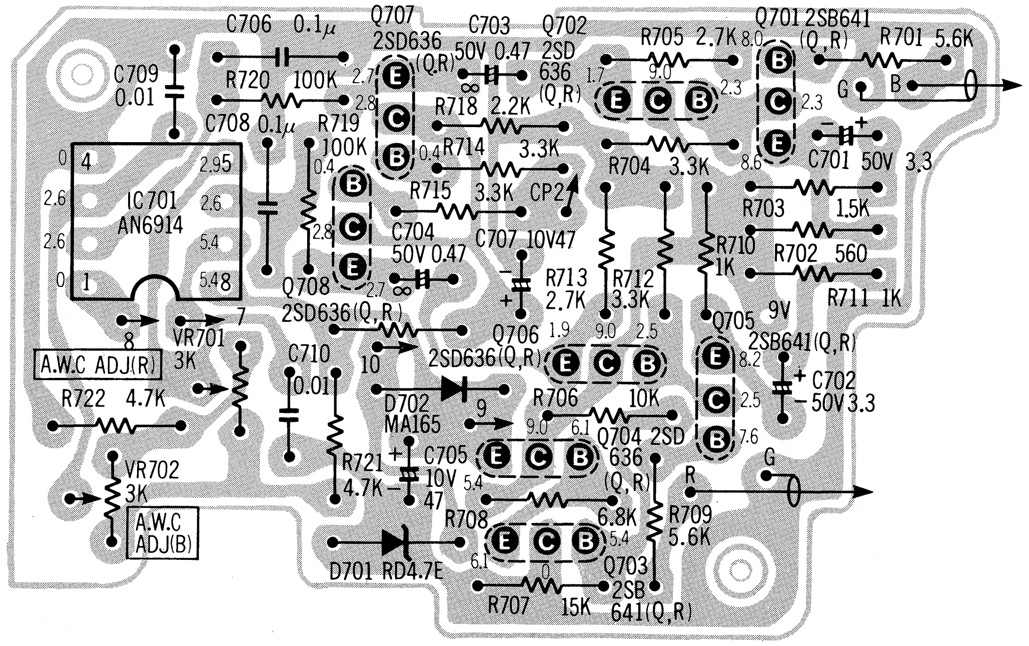

2SD669A
2SC1565A
B C E

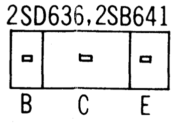

ERB28-06D
ERB28-04D
K
A

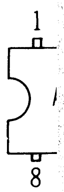
AWC SCHEMATIC DIAGRAM

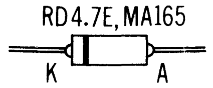

2
1
A
B
C
TO DEFLECTION/
NTSC SIGNAL OUTPUT
P618 - 2
P618 - 1
P620 - 1
P620 - 2
10
9
7
8
IC701
AN6914
AMP
AMP
A.W.C ADJ(B)
R721 47K
A.W.C ADJ(R)
VR702 3K
VR701 3K
C709 50V 0.01μ
R722 47K
C705 10V47
R717 2.2K
D702 MA165
Q704 2SD636(Q,R)
D701 RD4.7E
R720 100K
C706 50V 0.1μ
Q707 2SD636 (Q,R)
R714 3.3K
C710 50V 0.01μ
C707 10V47μ
Q708 2SD636 (Q,R)
R715 3.3K
R718 2.2K
R719 100K
C708 50V 0.1μ
C704 0.47μ

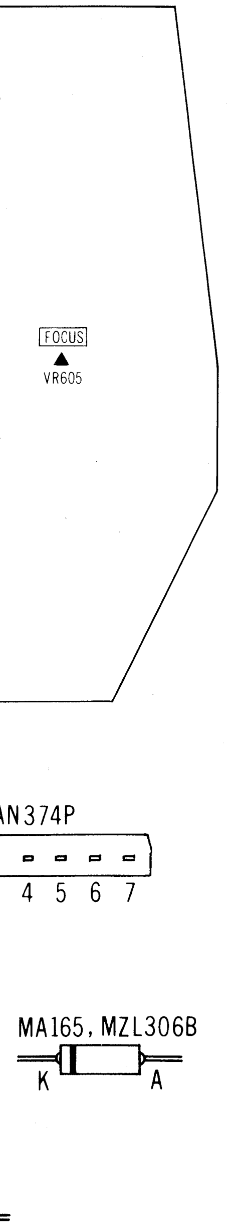
AWC CIRCUIT BOARD (VEPW0062)


C706 0.1μ
Q707 2SD636 (Q,R)
C703 50V 0.47
Q702 2SD 636 (Q,R)
R705 2.7K
Q701 2SB641 (Q,R)
R701 5.6K
C709 0.01
R720 100K
C708 0.1μ
R719 100K
R718 2.2K
R714 3.3K
R704 3.3K
C701 50V 3.3
IC701 AN6914
R715 3.3K
CP2
R703 1.5K
C704 50V 0.47
C707 10V47
R710 1K
R702 560
Q708 2SD636(Q,R)
R713 2.7K
R712 3.3K
R711 1K
A.W.C ADJ(R)
VR701 3K
C710 0.01
Q706 2SD636(Q,R)
Q705 2SB641(Q,R)
C702 50V3.3
R722 4.7K
D702 MA165
R706 10K
Q704 2SD 636 (Q,R)
VR702 3K
A.W.C ADJ(B)
R721 4.7K
C705 10V 47
R708 6.8K
R709 5.6K
D701 RD4.7E
Q703 2SB 641(Q,R)
R707 15K
9V
G
B
R
E
C
B

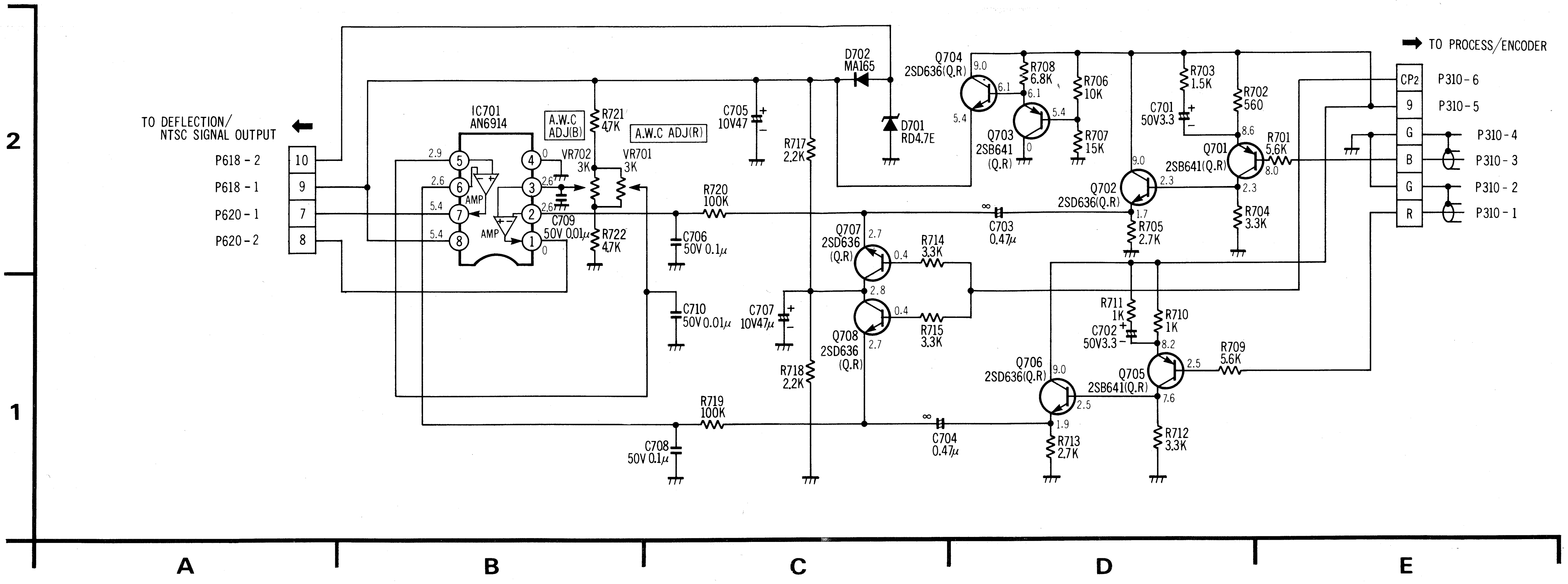

2SD636, 2SB641
B C E



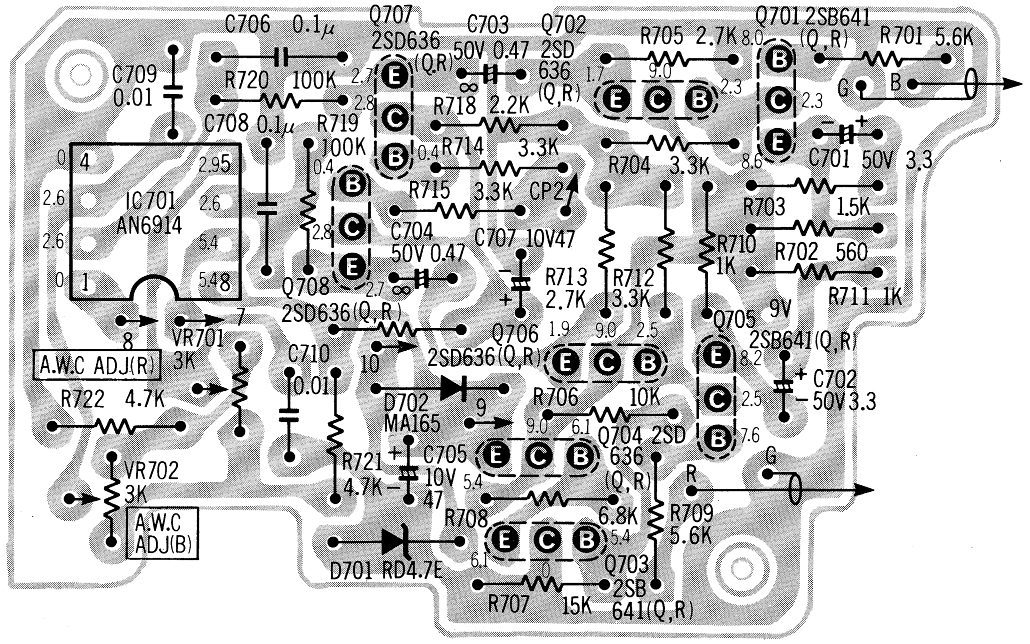

RD4.7E, MA165
K
A

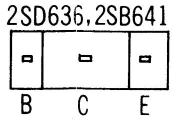

FOCUS
VR605
AN374P
4 5 6 7
MA165, MZL306B
K
A

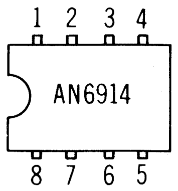
AWC SCHEMATIC DIAGRAM

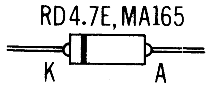

TO DEFLECTION/ NTSC SIGNAL OUTPUT
P618 - 2
P618 - 1
P620 - 1
P620 - 2
10
9
7
8
IC701
AN6914
AMP
AMP
A.W.C ADJ(B)
A.W.C ADJ(R)
VR702 3K
VR701 3K
R721 47K
R722 47K
C709 50V 0.01μ
C705 10V47
C706 50V 0.1μ
C710 50V 0.01μ
C707 10V47μ
C708 50V 0.1μ
R720 100K
R719 100K
R717 2.2K
R718 2.2K
D702 MA165
D701 RD4.7E
Q704 2SD636(Q.R)
Q703 2SB641 (Q.R)
Q707 2SD636 (Q.R)
Q708 2SD636 (Q.R)
Q702 2SD636(Q.R)
Q701 2SB641(Q.R)
Q706 2SD636(Q.R)
Q705 2SB641(Q.R)
R708 6.8K
R706 10K
R707 15K
R703 1.5K
R702 560
R701 5.6K
R704 3.3K
R705 2.7K
R714 3.3K
R715 3.3K
R711 1K
R710 1K
R709 5.6K
R713 2.7K
R712 3.3K
C701 50V3.3
C702 50V3.3
C703 0.47μ
C704 0.47μ
TO PROCESS/ENCODER
CP2
9
G
B
G
R
P310 - 6
P310 - 5
P310 - 4
P310 - 3
P310 - 2
P310 - 1
2
1
A
B
C
D
E

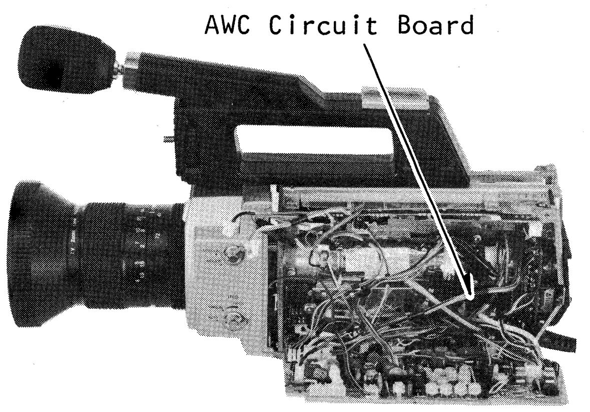
AWC CIRCUIT BOARD (VEPW0062)


C706 0.1μ
C709 0.01
R720 100K
C708 0.1μ
R719 100K
IC701 AN6914
Q707 2SD636 (Q.R)
C703 50V 0.47
Q702 2SD 636 (Q.R)
R718 2.2K
R714 3.3K
R715 3.3K
CP2
C704 50V 0.47
C707 10V47
Q708 2SD636(Q.R)
R705 2.7K
Q701 2SB641 (Q.R)
R701 5.6K
R704 3.3K
C701 50V 3.3
R703 1.5K
R702 560
R711 1K
R710 1K
R713 2.7K
R712 3.3K
Q705 2SB641(Q.R)
9V
C702 50V3.3
Q706 2SD636(Q.R)
R706 10K
Q704 2SD 636 (Q.R)
R709 5.6K
R708 6.8K
Q703 2SB 641(Q.R)
R707 15K
D702 MA165
C705 10V 47
R721 4.7K
D701 RD4.7E
VR701 3K
A.W.C ADJ(R)
R722 4.7K
VR702 3K
A.W.C ADJ(B)
C710 0.01
E
C
B
G
R

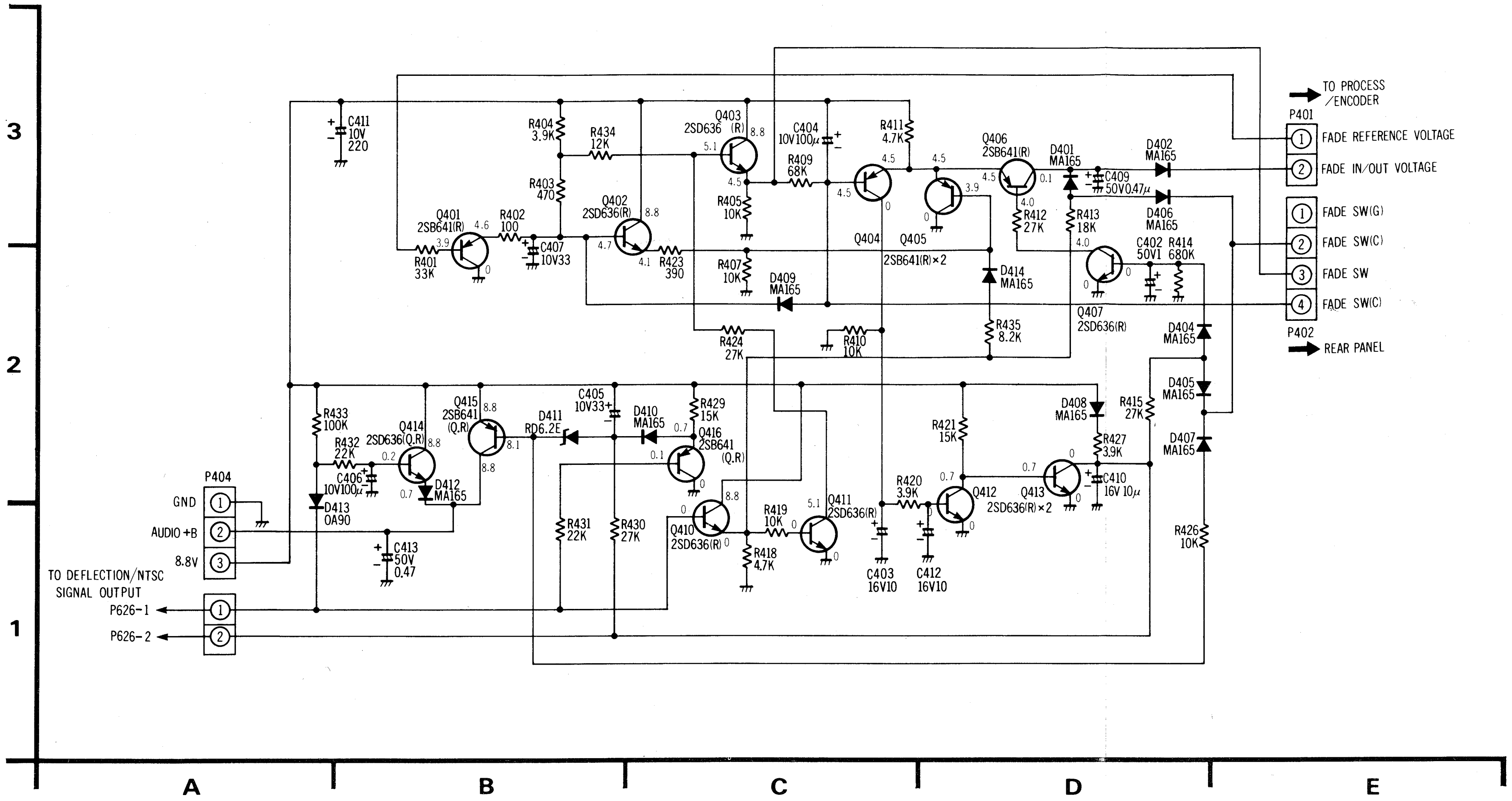

2SD636, 2SB641
B
C
E


1 2 3 4
AN6914
8 7 6 5

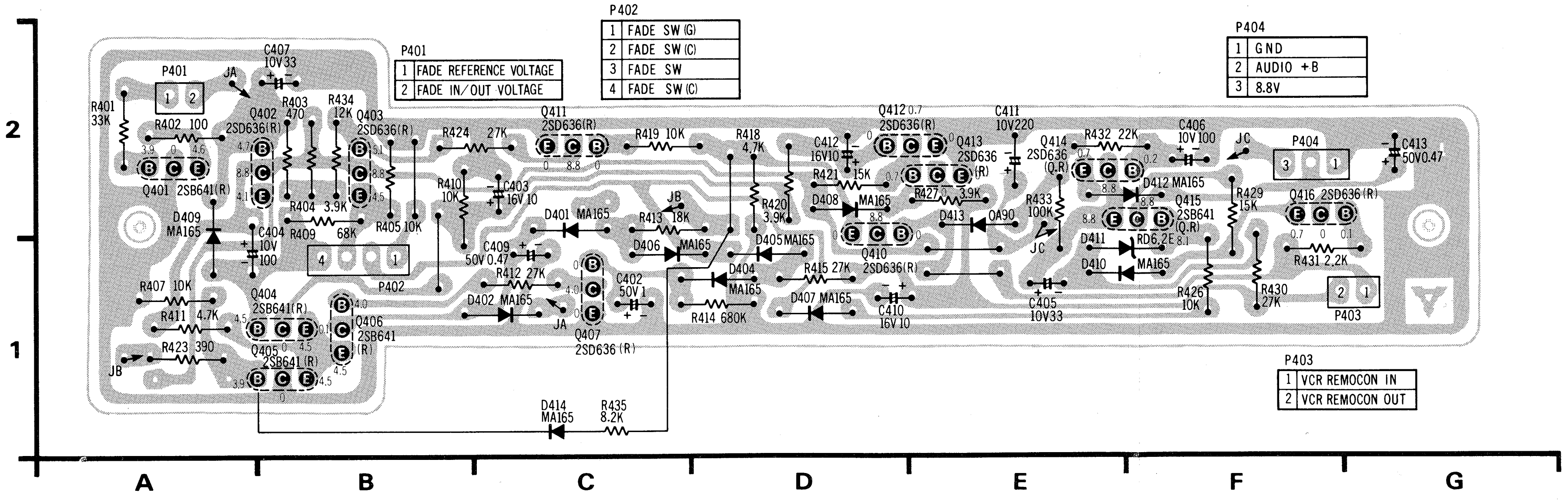

RD4.7E, MA165
K
A


AWC Circuit Board

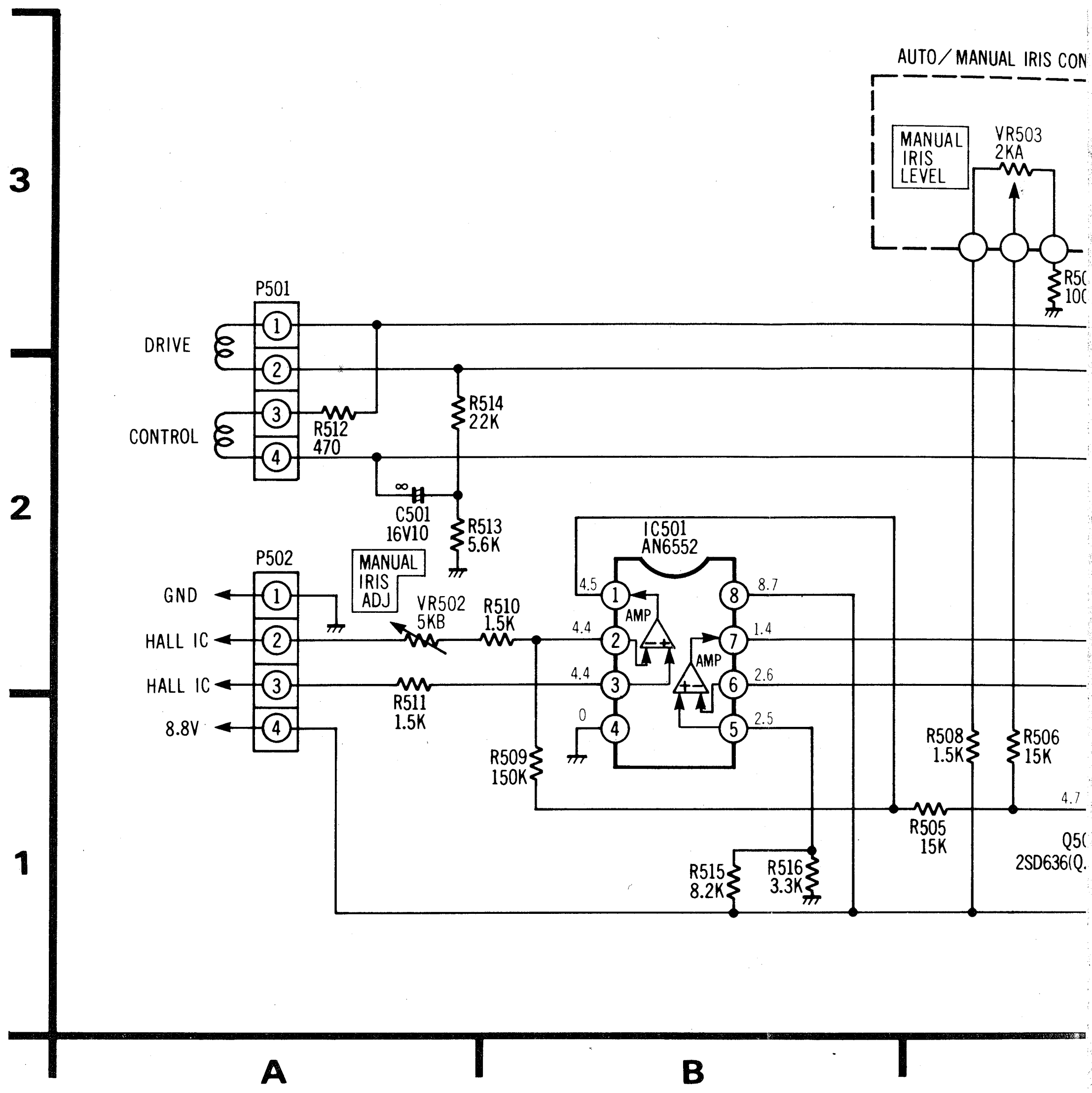
FADER SCHEMATIC DIAGRAM

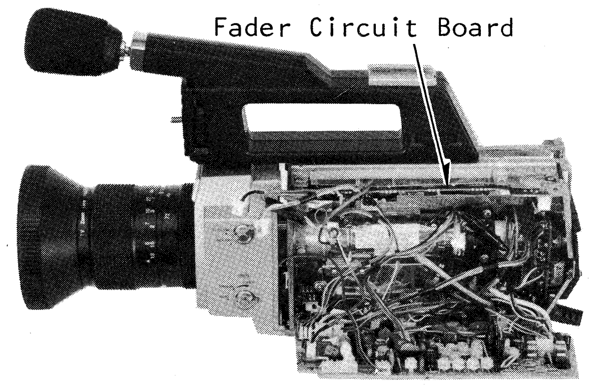

TO PROCESS /ENCODER
P401
① FADE REFERENCE VOLTAGE
② FADE IN/OUT VOLTAGE
① FADE SW(G)
② FADE SW(C)
③ FADE SW
④ FADE SW(C)
P402
REAR PANEL
P404
GND
AUDIO +B
8.8V
TO DEFLECTION/NTSC SIGNAL OUTPUT
P626-1
P626-2
Q401 2SB641(R)
Q402 2SD636(R)
Q403 2SD636 (R)
Q404
Q405 2SB641(R)×2
Q406 2SB641(R)
Q407 2SD636(R)
Q410 2SD636(R)
Q411 2SD636(R)
Q412
Q413 2SD636(R)×2
Q414 2SD636(Q,R)
Q415 2SB641 (Q,R)
Q416 2SB641 (Q,R)
C411 10V 220
C404 10V100μ
C407 10V33
C402 50V1
C409 50V0.47μ
C405 10V33
C406 10V100μ
C413 50V 0.47
C410 16V 10μ
C403 16V10
C412 16V10
D401 MA165
D402 MA165
D406 MA165
D409 MA165
D414 MA165
D404 MA165
D405 MA165
D407 MA165
D408 MA165
D410 MA165
D411 RD6.2E
D412 MA165
D413 OA90
R401 33K
R402 100
R403 470
R404 3.9K
R405 10K
R407 10K
R409 68K
R410 10K
R411 4.7K
R412 27K
R413 18K
R414 680K
R415 27K
R418 4.7K
R419 10K
R420 3.9K
R421 15K
R423 390
R424 27K
R426 10K
R427 3.9K
R429 15K
R430 27K
R431 22K
R432 22K
R433 100K
R434 12K
R435 8.2K
1
2
3
A
B
C
D
E

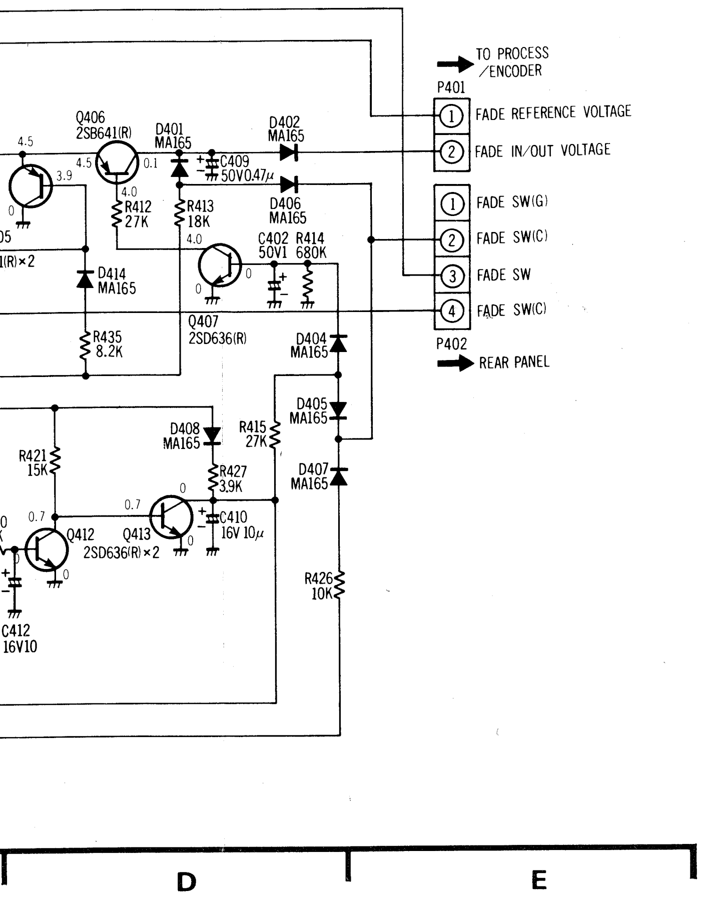
FADER CIRCUIT BOARD (VEPW0064)


P402
1 FADE SW(G)
2 FADE SW(C)
3 FADE SW
4 FADE SW(C)
P401
1 FADE REFERENCE VOLTAGE
2 FADE IN/OUT VOLTAGE
P404
1 GND
2 AUDIO +B
3 8.8V
P403
1 VCR REMOCON IN
2 VCR REMOCON OUT
JA
JB
JC
Q401 2SB641(R)
Q402 2SD636(R)
Q403 2SD636(R)
Q404 2SB641(R)
Q405 2SB641(R)
Q406 2SB641 (R)
Q407 2SD636 (R)
Q410 2SD636(R)
Q411 2SD636(R)
Q412 2SD636(R)
Q413 2SD636 (R)
Q414 2SD636 (Q,R)
Q415 2SB641 (Q,R)
Q416 2SD636 (R)
1
2
A
B
C
D
E
F
G

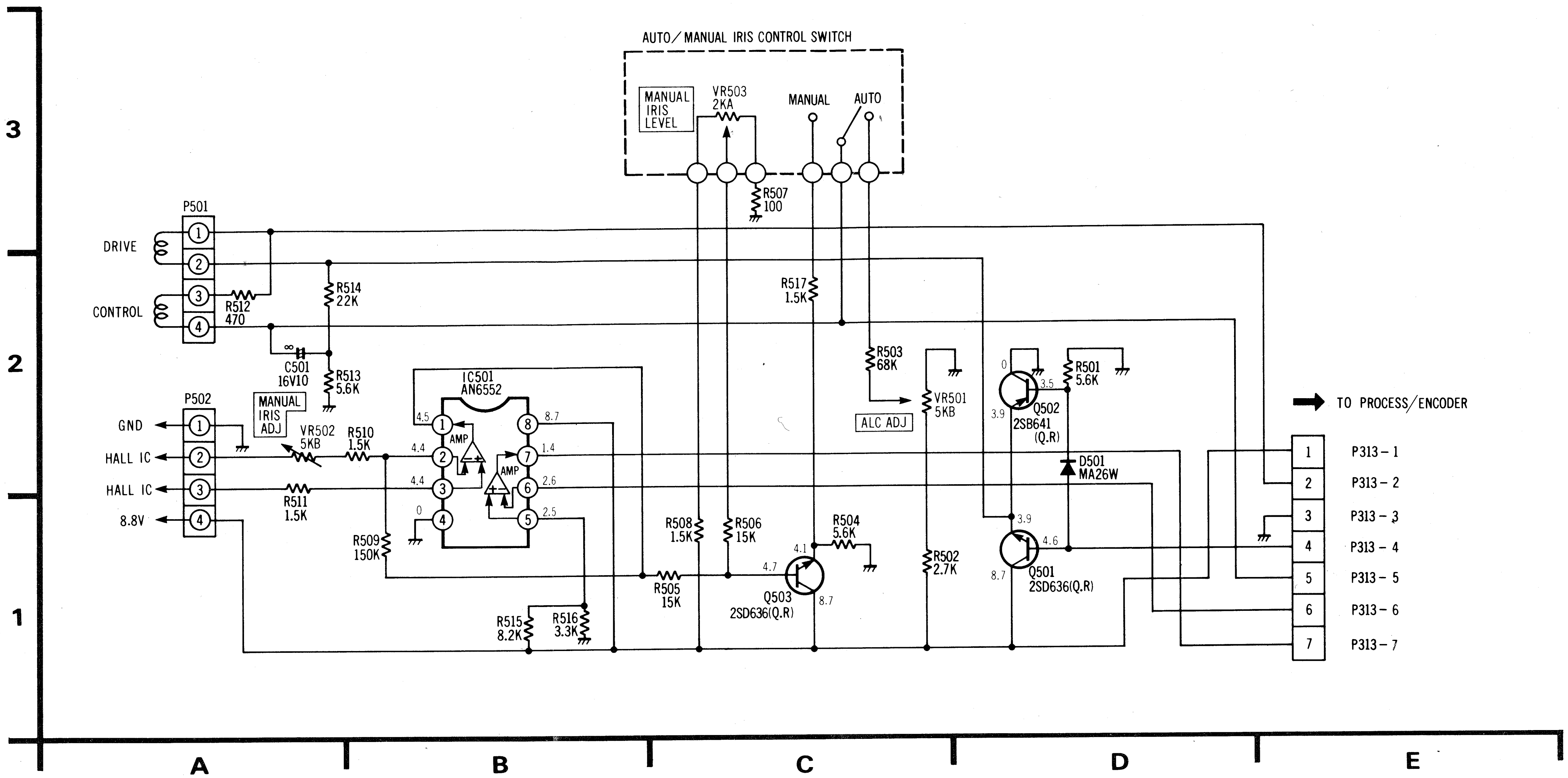
AUTOMATIC LENS IRIS CONTROL SCHEMATIC

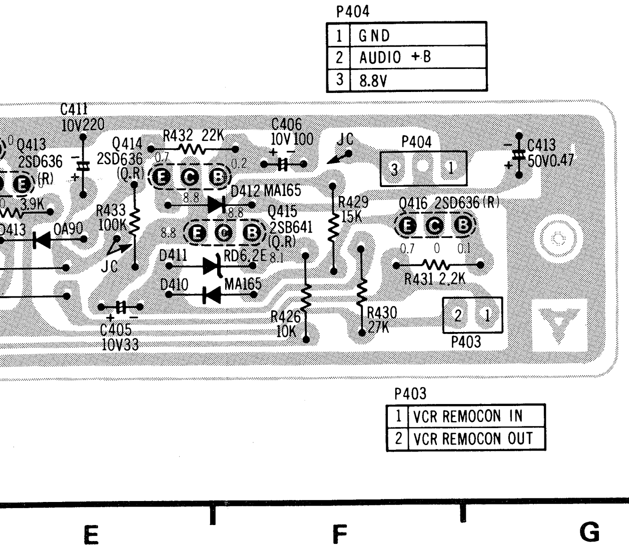

AUTO/MANUAL IRIS CON
MANUAL IRIS LEVEL
VR503 2KA
P501
DRIVE
CONTROL
R512 470
R514 22K
C501 16V10
R513 5.6K
P502
GND
HALL IC
HALL IC
8.8V
MANUAL IRIS ADJ
VR502 5KB
R510 1.5K
R511 1.5K
R509 150K
IC501 AN6552
AMP
AMP
R515 8.2K
R516 3.3K
R508 1.5K
R506 15K
R505 15K
1
2
3
A
B

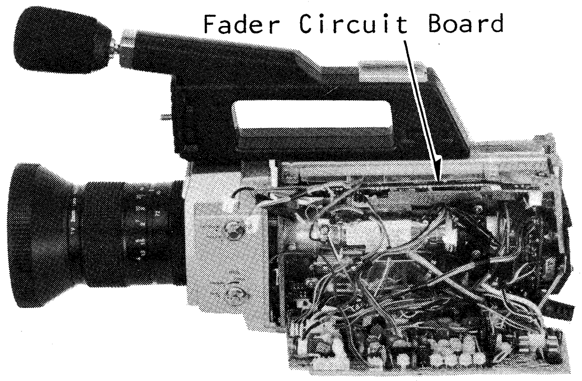

Fader Circuit Board

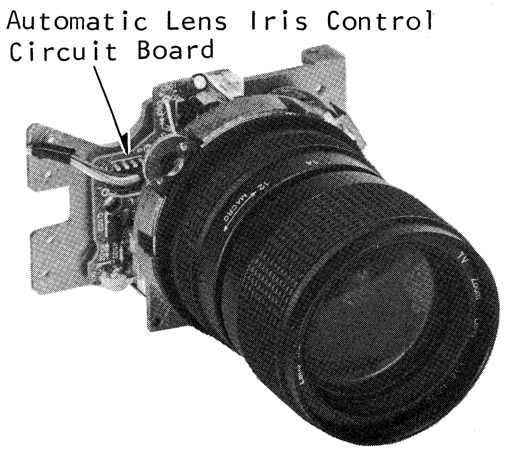

TO PROCESS /ENCODER
P401
① FADE REFERENCE VOLTAGE
② FADE IN/OUT VOLTAGE
① FADE SW(G)
② FADE SW(C)
③ FADE SW
④ FADE SW(C)
P402
REAR PANEL
Q406 2SB641(R)
D401 MA165
D402 MA165
C409 50V0.47μ
R412 27K
R413 18K
D406 MA165
C402 50V1
R414 680K
D414 MA165
R435 8.2K
Q407 2SD636(R)
D404 MA165
D405 MA165
D408 MA165
R415 27K
R421 15K
R427 3.9K
D407 MA165
C410 16V 10μ
Q412
Q413
2SD636(R)×2
R426 10K
C412 16V10
D
E

AUTOMATIC LENS IRIS CONTROL SCHEMATIC DIAGRAM

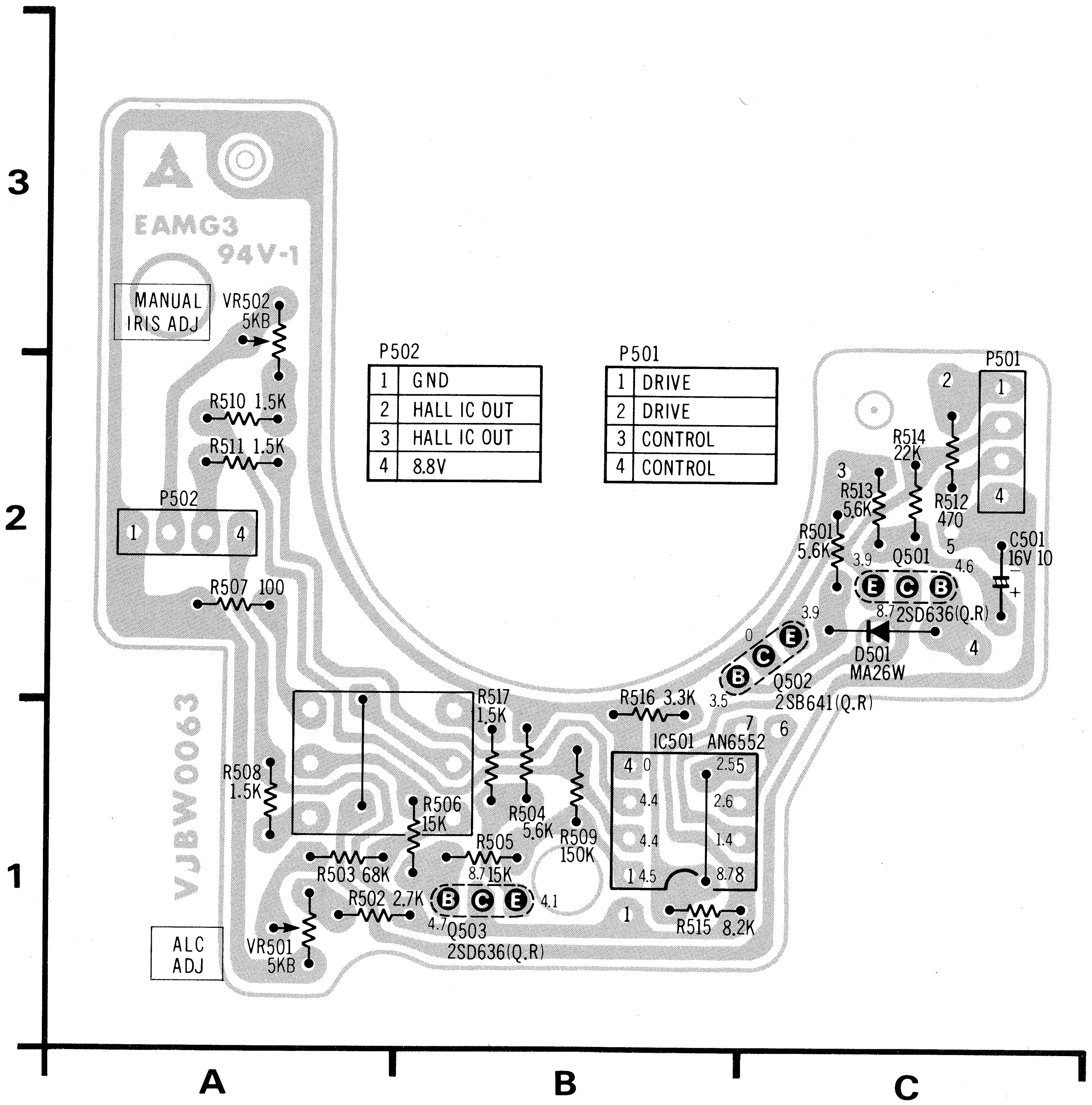

AUTO/MANUAL IRIS CONTROL SWITCH
MANUAL IRIS LEVEL
VR503 2KA
MANUAL
AUTO
R507 100
P501
DRIVE
CONTROL
R512 470
R514 22K
R517 1.5K
R503 68K
C501 16V10
R513 5.6K
MANUAL IRIS ADJ
VR502 5KB
R510 1.5K
R511 1.5K
IC501 AN6552
AMP
P502
GND
HALL IC
HALL IC
8.8V
R509 150K
R515 8.2K
R516 3.3K
R508 1.5K
R506 15K
R505 15K
R504 5.6K
Q503 2SD636(Q.R)
ALC ADJ
VR501 5KB
R502 2.7K
R501 5.6K
Q502 2SB641 (Q.R)
D501 MA26W
Q501 2SD636(Q.R)
TO PROCESS/ENCODER
P313-1
P313-2
P313-3
P313-4
P313-5
P313-6
P313-7
1
2
3
A
B
C
D
E

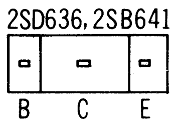

P404
1 GND
2 AUDIO +B
3 8.8V
C411 10V220
Q413 2SD636
Q414 2SD636 (Q.R)
R432 22K
C406 10V 100
JC
P404
C413 50V0.47
D412 MA165
R433 100K
Q415 2SB641 (Q.R)
R429 15K
Q416 2SD636(R)
D410
D411
RD6.2E
MA165
R431 2.2K
C405 10V33
R426 10K
R430 27K
P403
1 VCR REMOCON IN
2 VCR REMOCON OUT
E
F
G

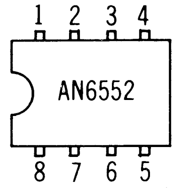

Fader Circuit Board

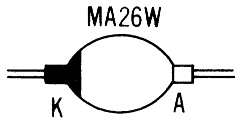

Automatic Lens Iris Control Circuit Board

AUTOMATIC LENS IRIS CONTROL CIRCUIT BOARD (VEPW0063)

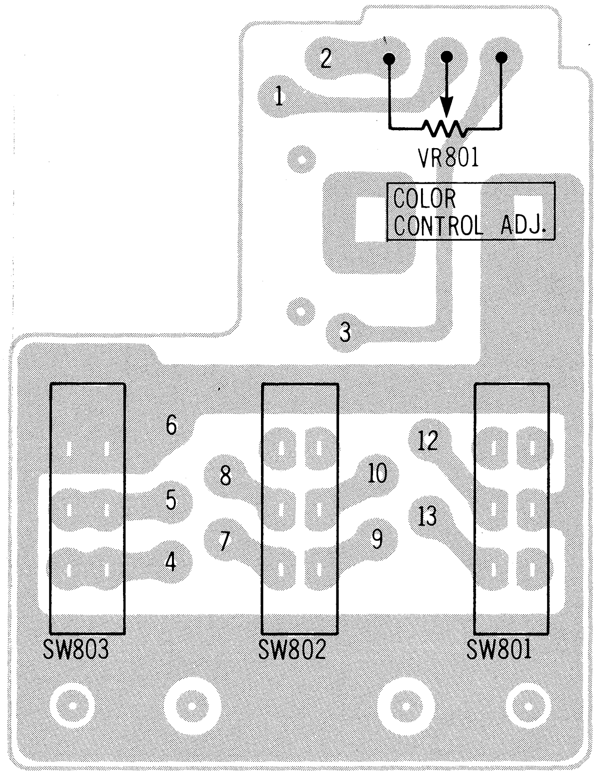

3
2
1
A
B
C
EAMG3
94V-1
VJBW0063
MANUAL IRIS ADJ
VR502 5KB
R510 1.5K
R511 1.5K
P502
1
4
R507 100
P502
1 GND
2 HALL IC OUT
3 HALL IC OUT
4 8.8V
P501
1 DRIVE
2 DRIVE
3 CONTROL
4 CONTROL
P501
R514 22K
R513 5.6K
R512 470
R501 5.6K
C501 16V 10
Q501
2SD636(Q.R)
D501 MA26W
Q502 2SB641(Q.R)
R516 3.3K
R517 1.5K
IC501 AN6552
R508 1.5K
R506 15K
R504 5.6K
R509 150K
R505 15K
R503 68K
R502 2.7K
Q503 2SD636(Q.R)
R515 8.2K
ALC ADJ
VR501 5KB


2SD636, 2SB641
B
C
E

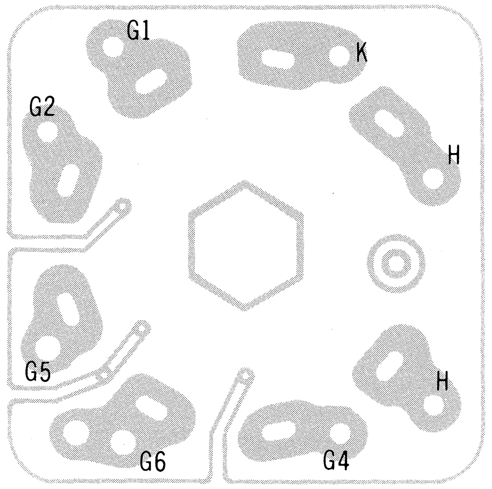

1 2 3 4
AN6552
8 7 6 5



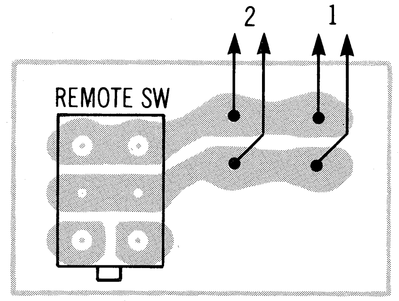
REAR SIDE CIRCUIT BOARD (VEPW0065)


1
2
3
VR801
COLOR CONTROL ADJ.
4
5
6
7
8
9
10
12
13
SW803
SW802
SW801

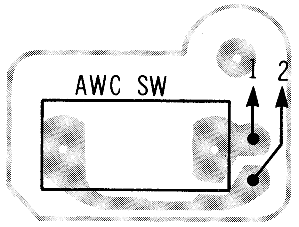
SPECIAL TUBE SOCKET CIRCUIT BOARD (VEPW0083)


G1
K
G2
H
G5
H
G6
G4

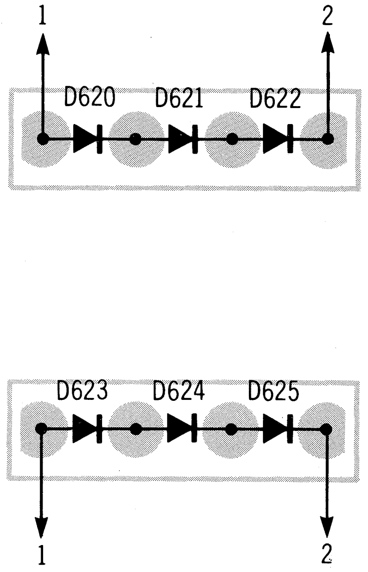
REMO. CON. SW CIRCUIT BOARD (VEPW0067)


2
1
REMOTE SW

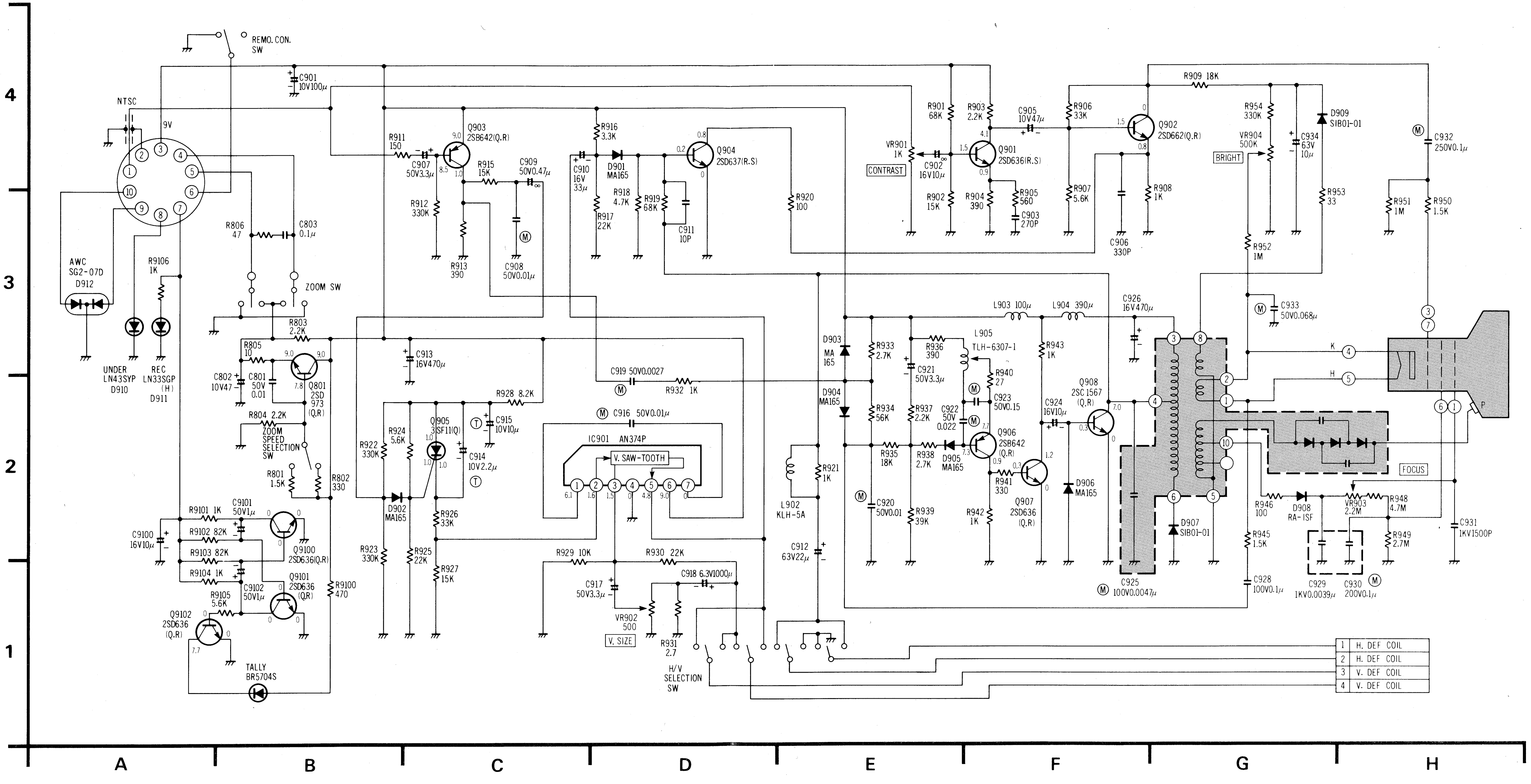
AWC SW CIRCUIT BOARD (VEPW0066)



BIAS LIGHT CIRCUIT BOARD


1
2
D620
D621
D622
D623
D624
D625
1
2

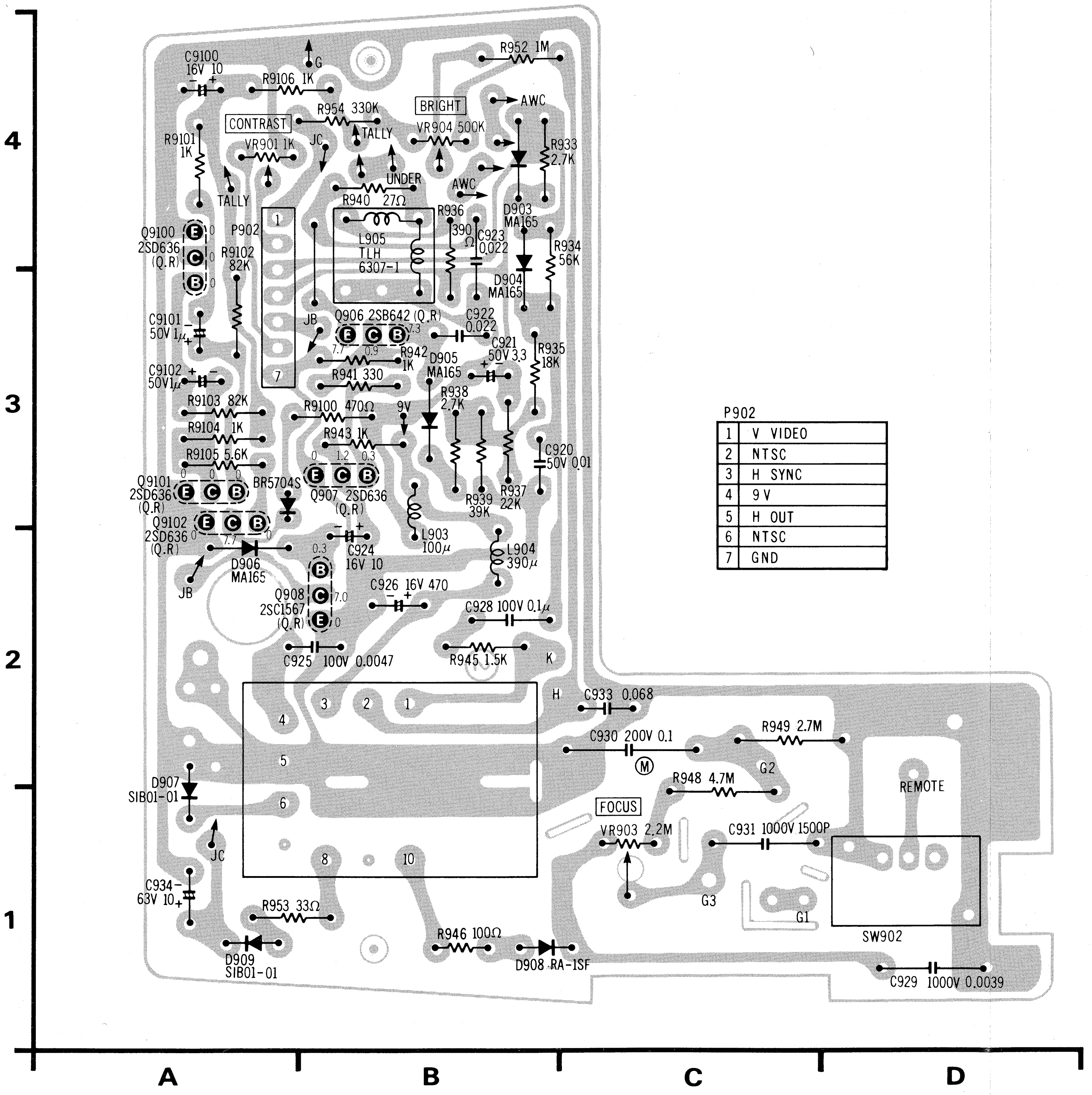
ELECTRONIC VIEWFINDER SCHEMATIC DIAGRAM


REMO. CON. SW
NTSC
9V
AWC SG2-07D D912
UNDER LN43SYP D910
REC LN33SGP (H) D911
R9106 1K
R806 47
C803 0.1μ
ZOOM SW
R803 2.2K
R805 10
C802 10V47
C801 50V 0.01
Q801 2SD973 (Q.R)
R804 2.2K
ZOOM SPEED SELECTION SW
R801 1.5K
R802 330
C901 10V100μ
R911 150
C907 50V3.3μ
Q903 2SB642(Q.R)
R915 15K
C909 50V0.47μ
R912 330K
R913 390
C908 50V0.01μ
C913 16V470μ
R928 8.2K
R922 330K
R924 5.6K
Q905 3SF11(Q)
C915 10V10μ
C914 10V2.2μ
D902 MA165
R926 33K
R923 330K
R925 22K
R927 15K
R916 3.3K
C910 16V 33μ
D901 MA165
R918 4.7K
R917 22K
R919 68K
C911 10P
Q904 2SD637(R.S)
R920 100
C919 50V0.0027
R932 1K
C916 50V0.01μ
IC901 AN374P
V. SAW-TOOTH
R929 10K
R930 22K
C917 50V3.3μ
C918 6.3V1000μ
VR902 500
V. SIZE
R931 2.7
H/V SELECTION SW
C9100 16V10μ
R9101 1K
C9101 50V1μ
R9102 82K
R9103 82K
R9104 1K
Q9100 2SD636(Q.R)
C9102 50V1μ
Q9101 2SD636 (Q.R)
R9105 5.6K
R9100 470
Q9102 2SD636 (Q.R)
TALLY BR5704S
VR901 1K
CONTRAST
C902 16V10μ
R901 68K
R902 15K
R903 2.2K
Q901 2SD636(R.S)
R904 390
R905 560
C903 270P
C905 10V47μ
R906 33K
R907 5.6K
Q902 2SD662(Q.R)
R908 1K
C906 330P
R909 18K
R954 330K
VR904 500K
BRIGHT
C934 63V 10μ
D909 SIB01-01
R953 33
R952 1M
C932 250V0.1μ
R951 1M
R950 1.5K
C933 50V0.068μ
D903 MA165
D904 MA165
R933 2.7K
R936 390
L903 100μ
L904 390μ
L905 TLH-6307-1
C926 16V470μ
R943 1K
C921 50V3.3μ
R940 27
C923 50V0.15
C922 50V 0.022
R934 56K
R937 2.2K
R935 18K
R938 2.7K
D905 MA165
Q906 2SB642 (Q.R)
R941 330
Q907 2SD636 (Q.R)
R942 1K
C920 50V0.01
R939 39K
R921 1K
L902 KLH-5A
C912 63V22μ
C924 16V10μ
Q908 2SC1567 (Q.R)
D906 MA165
D907 SIB01-01
C925 100V0.0047μ
K
H
P
FOCUS
R946 100
D908 RA-1SF
VR903 2.2M
R948 4.7M
R945 1.5K
R949 2.7M
C931 1KV1500P
C928 100V0.1μ
C929 1KV0.0039μ
C930 200V0.1μ
1 H. DEF COIL
2 H. DEF COIL
3 V. DEF COIL
4 V. DEF COIL
1
2
3
4
A
B
C
D
E
F
G
H

PRODUCT SAFETY NOTE

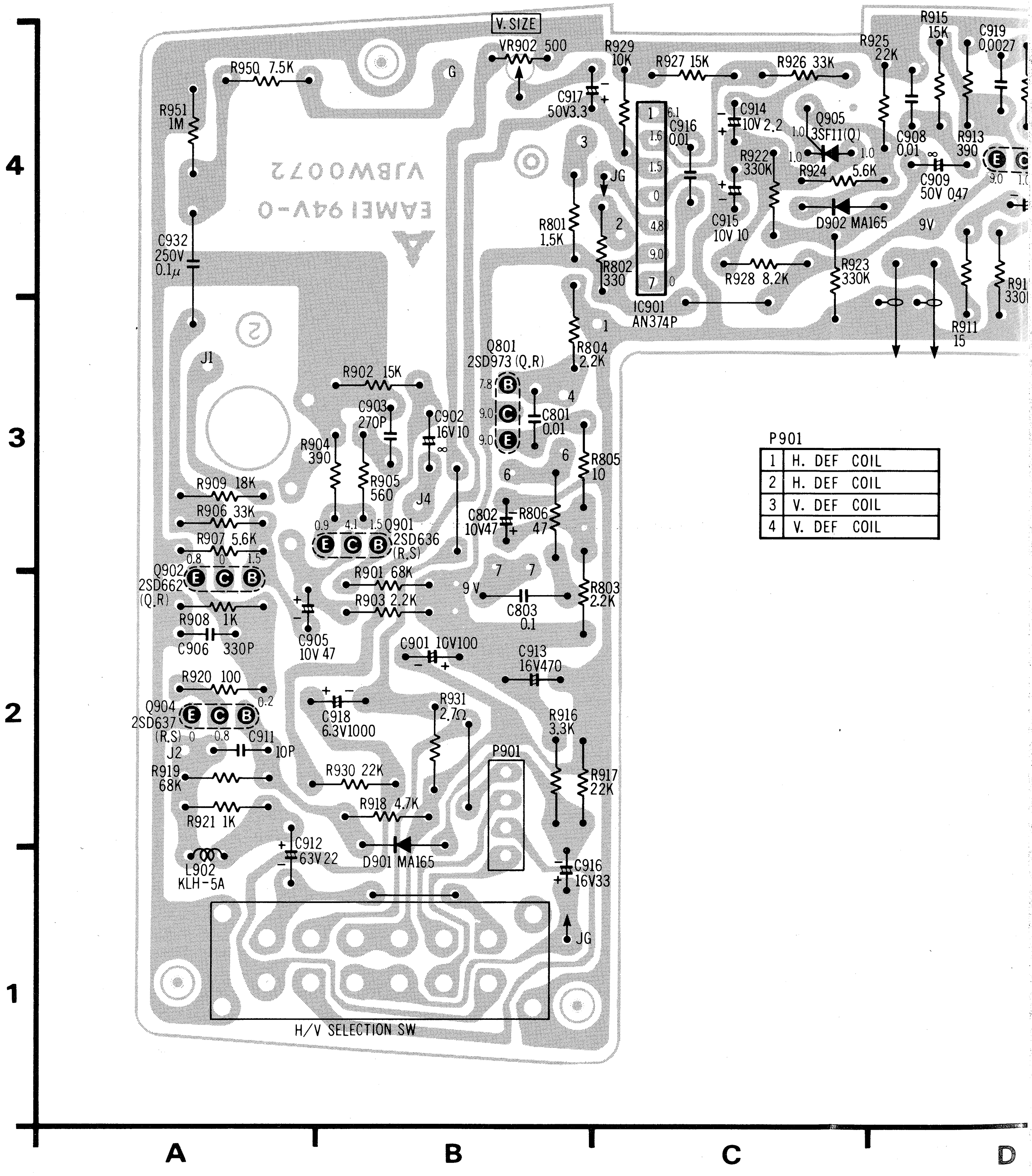
The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

ELECTRONIC VIEWFINDER CIRCUIT BOARD


4
3
2
1
A
B
C
D
C9100 16V 10
R9106 1K
G
R952 1M
R954 330K
CONTRAST
BRIGHT
VR904 500K
AWC
R9101 1K
VR901 1K
JC
TALLY
UNDER
R933 2.7K
R940 27Ω
R936 390Ω
D903 MA165
P902
L905 TLH 6307-1
C923 0.022
R934 56K
Q9100 2SD636 (Q.R)
R9102 82K
D904 MA165
JB
Q906 2SB642 (Q.R)
C922 0.022
C9101 50V 1μ
C921 50V 3.3
R935 18K
C9102 50V 1μ
R942 1K
D905 MA165
R941 330
R9103 82K
R938 2.7K
R9100 470Ω
9V
R9104 1K
R943 1K
C920 50V 0.01
R9105 5.6K
Q9101 2SD636 (Q.R)
BR5704S
Q907 2SD636 (Q.R)
R939 39K
R937 22K
Q9102 2SD636 (Q.R)
L903 100μ
L904 390μ
D906 MA165
C924 16V 10
JB
Q908 2SC1567 (Q.R)
C926 16V 470
C928 100V 0.1μ
C925 100V 0.0047
R945 1.5K
K
H
C933 0.068
C930 200V 0.1
R949 2.7M
R948 4.7M
G2
D907 SIB01-01
REMOTE
FOCUS
VR903 2.2M
C931 1000V 1500P
JC
G3
G1
C934 63V 10
R953 33Ω
R946 100Ω
SW902
D909 SIB01-01
D908 RA-1SF
C929 1000V 0.0039

P902

1	V VIDEO
2	NTSC
3	H SYNC
4	9V
5	H OUT
6	NTSC
7	GND

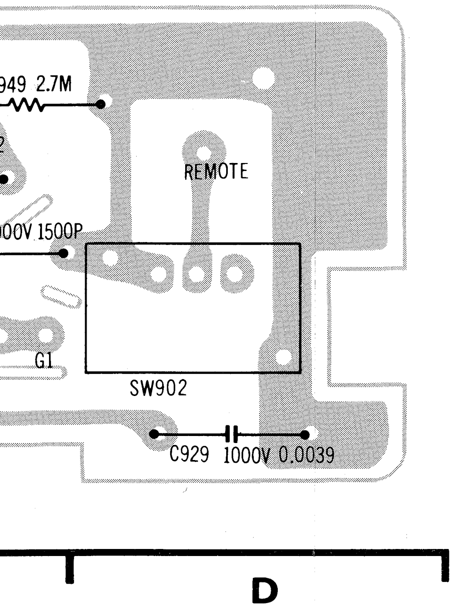

4
3
2
1
A
B
C
D
V.SIZE
VR902 500
R915 15K
C919 0.0027
R925 22K
R950 7.5K
R929 10K
R927 15K
R926 33K
G
R951 1M
C917 50V3.3
C914 10V 2.2
Q905 3SF11(Q)
C916 0.01
C908 0.01
R913 390
VJBW0072
R922 330K
R924 5.6K
C909 50V 047
JG
EAMEI 94V-0
R801 1.5K
C915 10V 10
D902 MA165
9V
C932 250V 0.1μ
R802 330
R928 8.2K
R923 330K
IC901 AN374P
R911 15
J1
Q801 2SD973 (Q.R)
R804 2.2K
R902 15K
C903 270P
C902 16V 10
C801 0.01
R904 390
R905 560
J4
R805 10
R909 18K
R906 33K
Q901 2SD636 (R.S)
C802 10V 47
R806 47
R907 5.6K
Q902 2SD662 (Q.R)
R901 68K
R903 2.2K
9V
R803 2.2K
C803 0.1
R908 1K
C906 330P
C905 10V 47
C901 10V 100
C913 16V 470
R920 100
Q904 2SD637 (R.S)
C918 6.3V 1000
R931 2.7Ω
R916 3.3K
J2
C911 10P
P901
R919 68K
R930 22K
R917 22K
R918 4.7K
R921 1K
C912 63V 22
L902 KLH-5A
D901 MA165
C916 16V 33
JG
H/V SELECTION SW

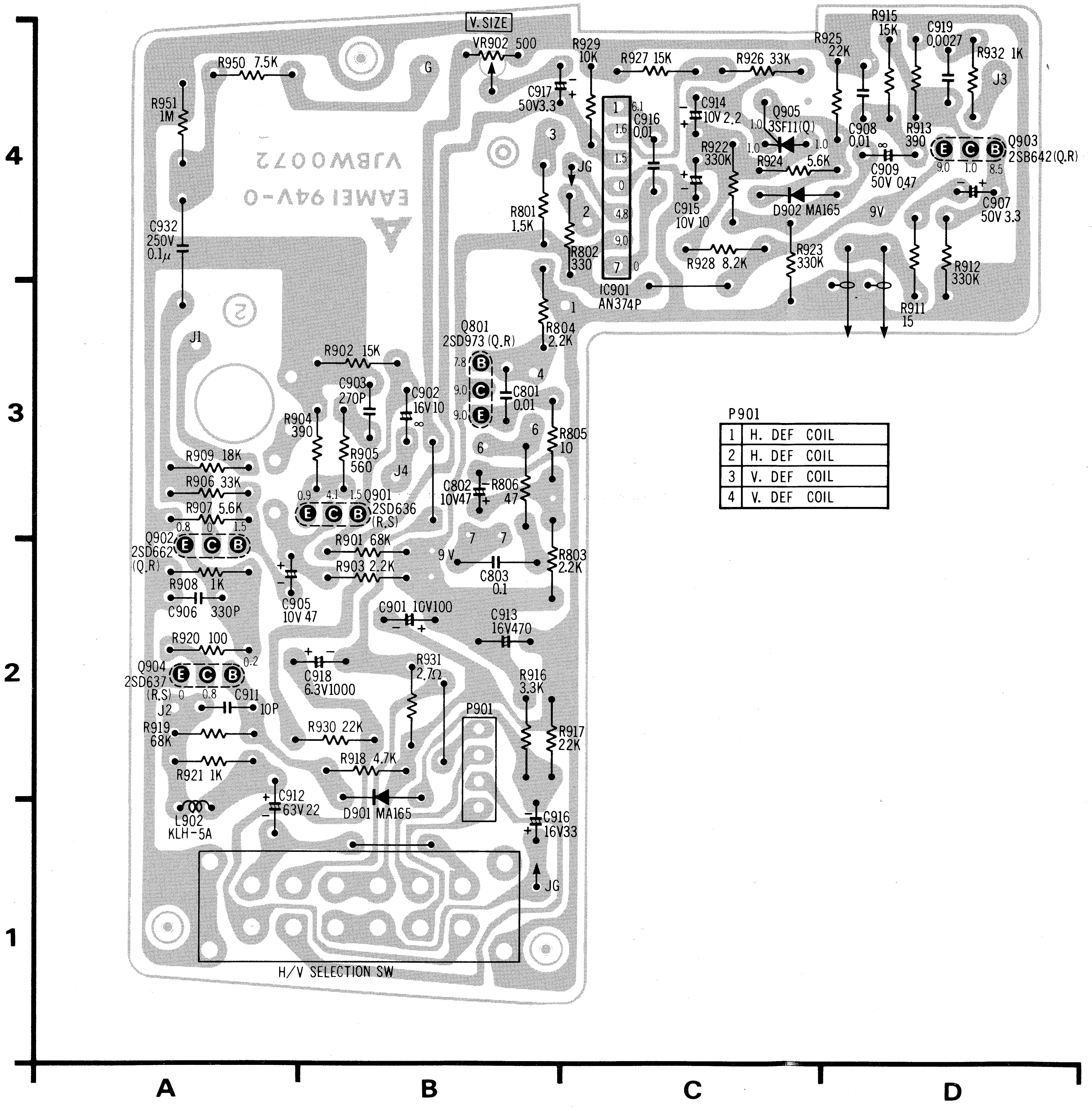
P901

1	H. DEF COIL
2	H. DEF COIL
3	V. DEF COIL
4	V. DEF COIL

VIDEO
SC
SYNC

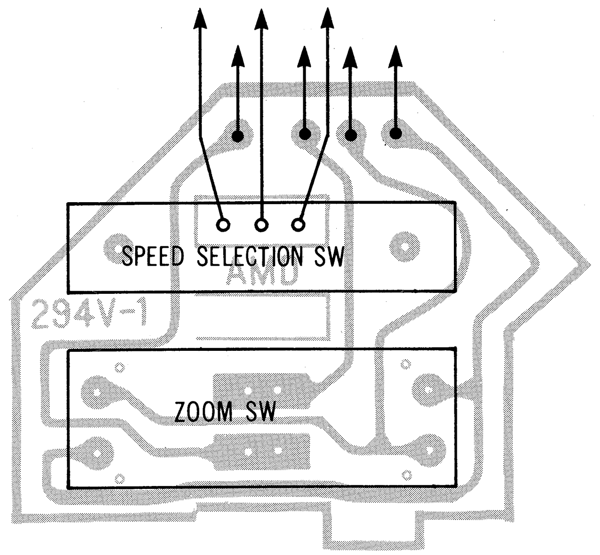
OUT
SC
D


949 2.7M
REMOTE
00V 1500P
G1
SW902
C929 1000V 0.0039
D

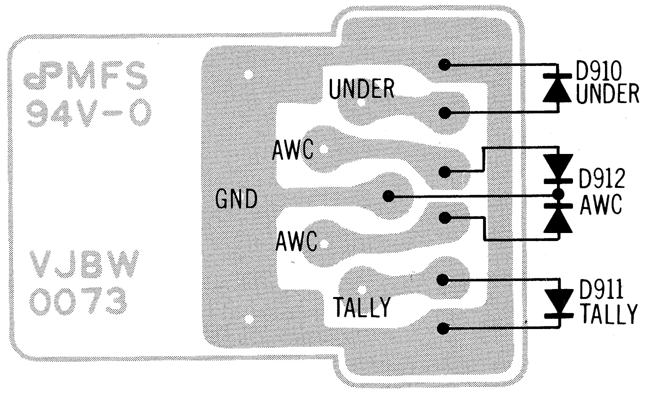

V.SIZE
VR902 500
R950 7.5K
G
R951 1M
VJBW0072
EAMEI 94V-0
C932 250V 0.1μ
J1
R929 10K
C917 50V3.3
R927 15K
R926 33K
R925 22K
R915 15K
C919 0.0027
R932 1K
J3
C916 0.01
C914 10V 2.2
Q905 3SF11(Q)
C908 0.01
R913 390
Q903 2SB642(Q.R)
R922 330K
R924 5.6K
C909 50V 0.47
C907 50V 3.3
D902 MA165
9V
C915 10V 10
R801 1.5K
R802 330
JG
R928 8.2K
R923 330K
R912 330K
R911 15
IC901 AN374P
Q801 2SD973 (Q.R)
R804 2.2K
C801 0.01
R902 15K
C903 270P
C902 16V10
R904 390
R905 560
J4
R805 10
R909 18K
R906 33K
R907 5.6K
Q901 2SD636 (R.S)
C802 10V47
R806 47
Q902 2SD662 (Q.R)
R901 68K
R903 2.2K
9V
C803 0.1
R803 2.2K
R908 1K
C906 330P
C905 10V 47
C901 10V100
C913 16V470
R920 100
Q904 2SD637 (R.S)
C911 10P
J2
C918 6.3V1000
R931 2.7Ω
R916 3.3K
R917 22K
R919 68K
R930 22K
R918 4.7K
P901
R921 1K
L902 KLH-5A
C912 63V22
D901 MA165
C916 16V33
JG
H/V SELECTION SW
1
2
3
4
A
B
C
D

	P901
1	H. DEF COIL
2	H. DEF COIL
3	V. DEF COIL
4	V. DEF COIL

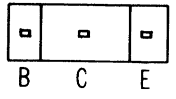
ZOOM SW CIRCUIT BOARD
(VEPW0075)


SPEED SELECTION SW
AMD
294V-1
ZOOM SW

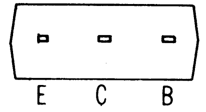
EVF LED CIRCUIT BOARD
(VEPW0073)


PMFS 94V-0
VJBW 0073
UNDER
AWC
GND
AWC
TALLY
D910 UNDER
D912 AWC
AWC
D911 TALLY

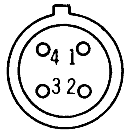
2SD973
2SD636, 2SD662
2SD637, 2SB642



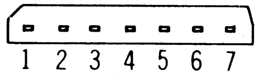
2SC1567



3SF11

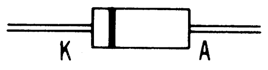


AN374P

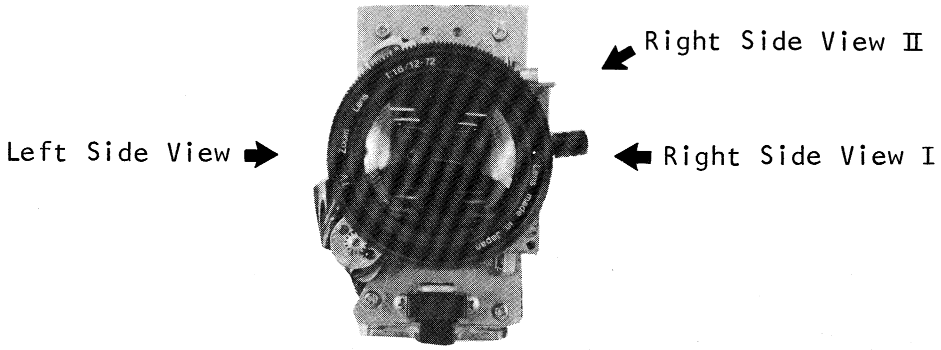


MA165

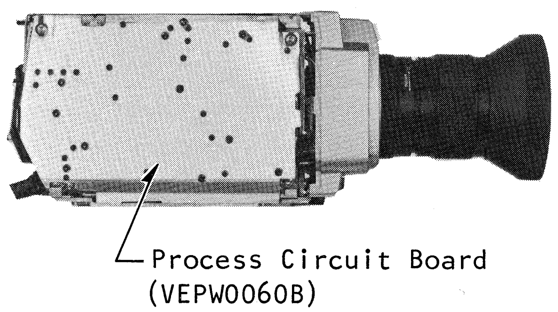
SIB01-01



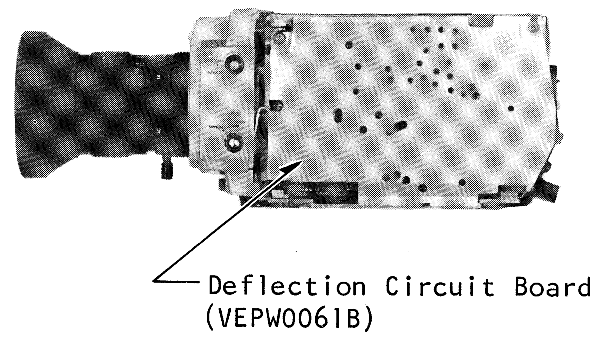
CIRCUIT BOARD LAYOUT


Right Side View II
Left Side View
Right Side View I

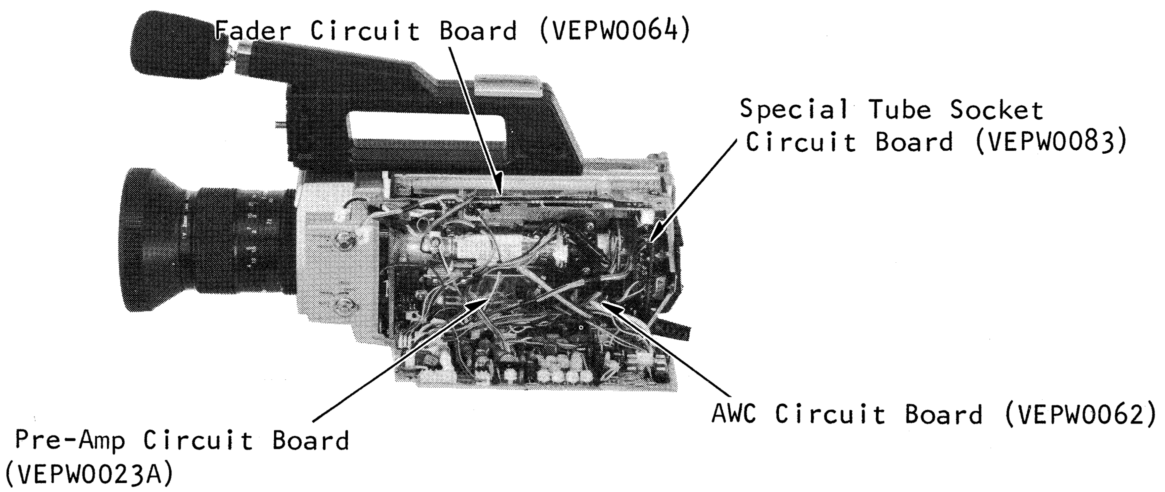
Left Side View


Process Circuit Board
(VEPW0060B)

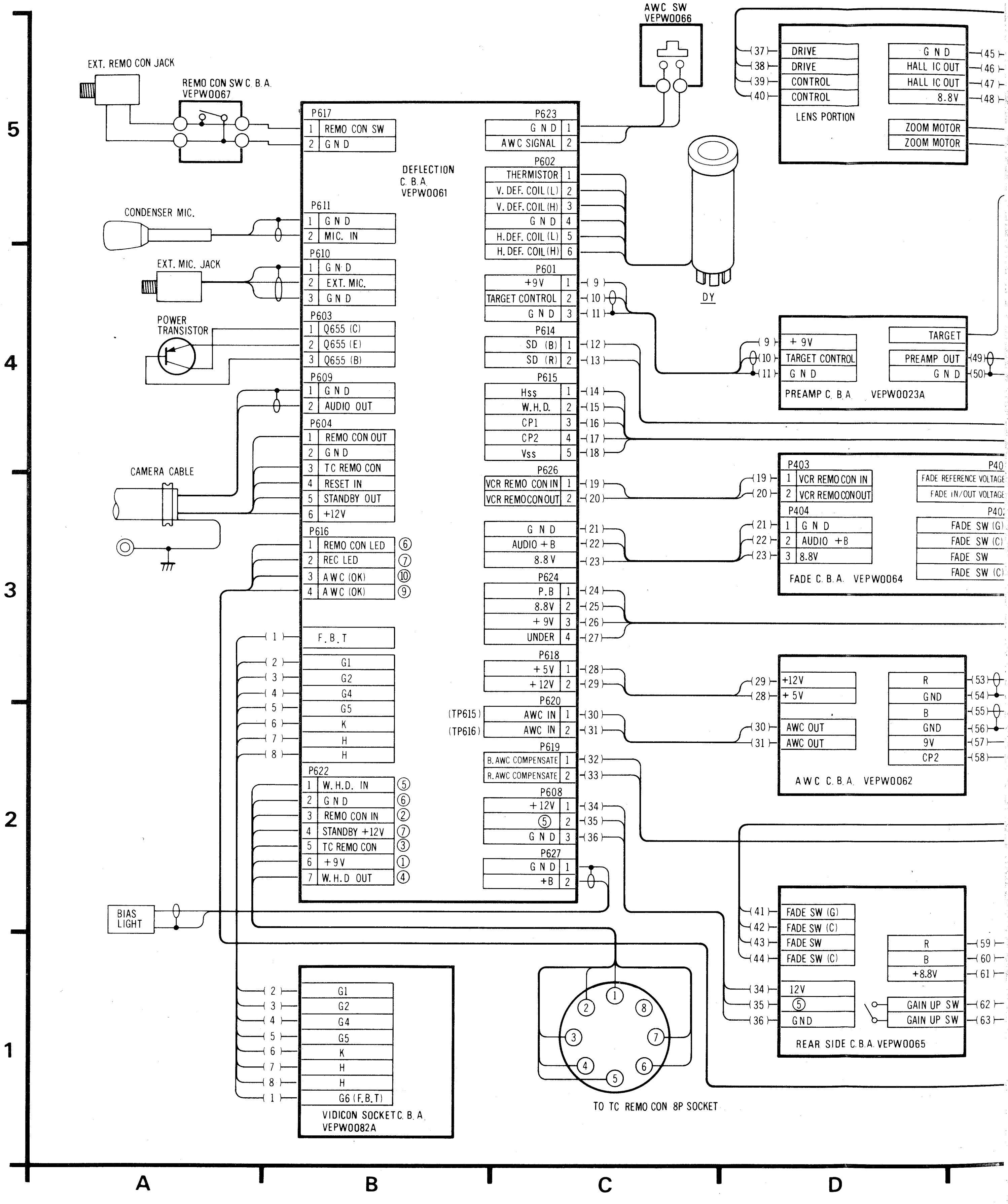
Right Side View I


Deflection Circuit Board
(VEPW0061B)

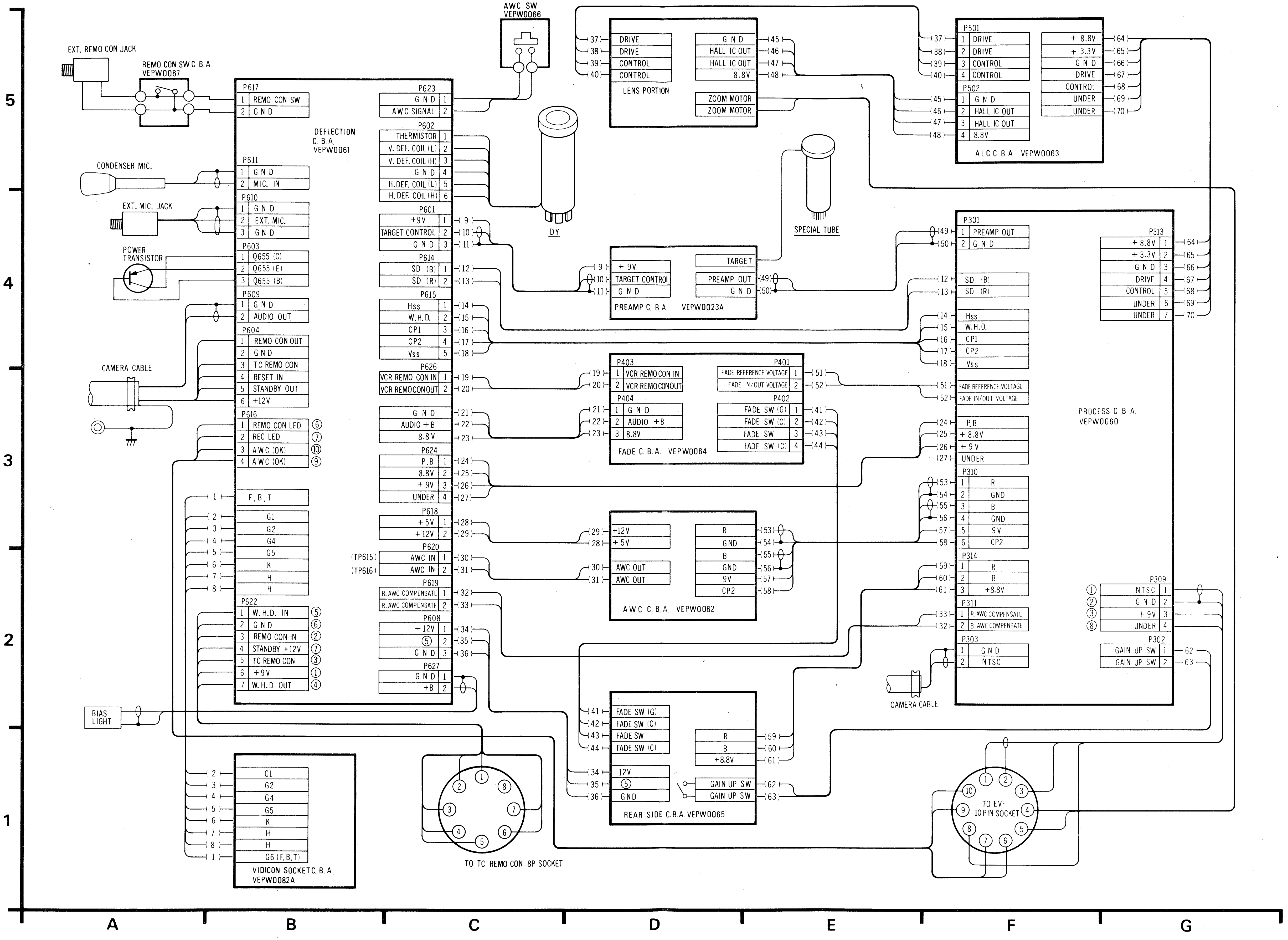
Right Side View II


Fader Circuit Board (VEPW0064)
Special Tube Socket
Circuit Board (VEPW0083)
Pre-Amp Circuit Board
(VEPW0023A)
AWC Circuit Board (VEPW0062)

CAMERA UNIT INTERCONNECTION SCHEMATIC DIAGRAM


AWC SW
VEPW0066
EXT. REMO CON JACK
REMO CON SW C. B. A.
VEPW0067
P617
1 REMO CON SW
2 GND
P623
GND 1
AWC SIGNAL 2
DEFLECTION
C. B. A.
VEPW0061
P602
THERMISTOR 1
V. DEF. COIL (L) 2
V. DEF. COIL (H) 3
GND 4
H. DEF. COIL (L) 5
H. DEF. COIL (H) 6
CONDENSER MIC.
P611
1 GND
2 MIC. IN
P610
1 GND
2 EXT. MIC.
3 GND
EXT. MIC. JACK
P601
+9V 1
TARGET CONTROL 2
GND 3
POWER
TRANSISTOR
P603
1 Q655 (C)
2 Q655 (E)
3 Q655 (B)
P614
SD (B) 1
SD (R) 2
P609
1 GND
2 AUDIO OUT
P615
Hss 1
W.H.D. 2
CP1 3
CP2 4
Vss 5
P604
1 REMO CON OUT
2 GND
3 TC REMO CON
4 RESET IN
5 STANDBY OUT
6 +12V
CAMERA CABLE
P626
VCR REMO CON IN 1
VCR REMOCON OUT 2
P616
1 REMO CON LED ⑥
2 REC LED ⑦
3 AWC (OK) ⑩
4 AWC (OK) ⑨
GND
AUDIO +B
8.8V
P624
P.B 1
8.8V 2
+9V 3
UNDER 4
F.B.T
G1
G2
G4
G5
K
H
H
P618
+5V 1
+12V 2
P620
(TP615) AWC IN 1
(TP616) AWC IN 2
P619
B. AWC COMPENSATE 1
R. AWC COMPENSATE 2
P622
1 W.H.D. IN ⑤
2 GND ⑥
3 REMO CON IN ②
4 STANDBY +12V ⑦
5 TC REMO CON ③
6 +9V ①
7 W.H.D OUT ④
P608
+12V 1
⑤ 2
GND 3
P627
GND 1
+B 2
BIAS
LIGHT
G1
G2
G4
G5
K
H
H
G6 (F.B.T)
VIDICON SOCKET C. B. A.
VEPW0082A
TO TC REMO CON 8P SOCKET
DY
DRIVE
DRIVE
CONTROL
CONTROL
GND
HALL IC OUT
HALL IC OUT
8.8V
LENS PORTION
ZOOM MOTOR
ZOOM MOTOR
+9V
TARGET CONTROL
GND
TARGET
PREAMP OUT
GND
PREAMP C. B. A. VEPW0023A
P403
1 VCR REMO CON IN
2 VCR REMOCON OUT
P404
1 GND
2 AUDIO +B
3 8.8V
FADE REFERENCE VOLTAGE
FADE IN/OUT VOLTAGE
FADE SW (G)
FADE SW (C)
FADE SW
FADE SW (C)
FADE C. B. A. VEPW0064
+12V
+5V
AWC OUT
AWC OUT
R
GND
B
GND
9V
CP2
AWC C. B. A. VEPW0062
FADE SW (G)
FADE SW (C)
FADE SW
FADE SW (C)
R
B
+8.8V
12V
⑤
GND
GAIN UP SW
GAIN UP SW
REAR SIDE C. B. A. VEPW0065
5
4
3
2
1
A
B
C
D

CAMERA UNIT INTERCONNECTION SCHEMATIC DIAGRAM


EXT. REMO CON JACK
REMO CON SW C.B.A VEPW0067
AWC SW VEPW0066
CONDENSER MIC.
EXT. MIC. JACK
POWER TRANSISTOR
CAMERA CABLE
BIAS LIGHT
DEFLECTION C.B.A VEPW0061
P617 1 REMO CON SW 2 GND
P611 1 GND 2 MIC. IN
P610 1 GND 2 EXT. MIC. 3 GND
P603 1 Q655 (C) 2 Q655 (E) 3 Q655 (B)
P609 1 GND 2 AUDIO OUT
P604 1 REMO CON OUT 2 GND 3 TC REMO CON 4 RESET IN 5 STANDBY OUT 6 +12V
P616 1 REMO CON LED ⑥ 2 REC LED ⑦ 3 AWC (OK) ⑩ 4 AWC (OK) ⑨
F.B.T
G1 G2 G4 G5 K H H
P622 1 W.H.D. IN ⑤ 2 GND ⑥ 3 REMO CON IN ② 4 STANDBY +12V ⑦ 5 TC REMO CON ③ 6 +9V ① 7 W.H.D OUT ④
P623 GND 1 AWC SIGNAL 2
P602 THERMISTOR 1 V. DEF. COIL (L) 2 V. DEF. COIL (H) 3 GND 4 H. DEF. COIL (L) 5 H. DEF. COIL (H) 6
P601 +9V 1 TARGET CONTROL 2 GND 3
P614 SD (B) 1 SD (R) 2
P615 Hss 1 W.H.D. 2 CP1 3 CP2 4 Vss 5
P626 VCR REMO CON IN 1 VCR REMOCON OUT 2
GND AUDIO +B 8.8V
P624 P.B 1 8.8V 2 +9V 3 UNDER 4
P618 +5V 1 +12V 2
P620 (TP615) AWC IN 1 (TP616) AWC IN 2
P619 B. AWC COMPENSATE 1 R. AWC COMPENSATE 2
P608 +12V 1 ⑤ 2 GND 3
P627 GND 1 +B 2
DY
LENS PORTION
DRIVE DRIVE CONTROL CONTROL
GND HALL IC OUT HALL IC OUT 8.8V
ZOOM MOTOR ZOOM MOTOR
SPECIAL TUBE
PREAMP C.B.A VEPW0023A
+9V TARGET CONTROL GND TARGET PREAMP OUT GND
FADE C.B.A VEPW0064
P403 1 VCR REMO CON IN 2 VCR REMOCONOUT
P404 1 GND 2 AUDIO +B 3 8.8V
P401 FADE REFERENCE VOLTAGE 1 FADE IN/OUT VOLTAGE 2
P402 FADE SW (G) 1 FADE SW (C) 2 FADE SW 3 FADE SW (C) 4
AWC C.B.A VEPW0062
+12V +5V AWC OUT AWC OUT
R GND B GND 9V CP2
REAR SIDE C.B.A VEPW0065
FADE SW (G) FADE SW (C) FADE SW FADE SW (C)
R B +8.8V
12V ⑤ GND GAIN UP SW GAIN UP SW
VIDICON SOCKET C.B.A VEPW0082A
G1 G2 G4 G5 K H H G6 (F.B.T)
TO TC REMO CON 8P SOCKET
ALC C.B.A VEPW0063
P501 1 DRIVE 2 DRIVE 3 CONTROL 4 CONTROL
P502 1 GND 2 HALL IC OUT 3 HALL IC OUT 4 8.8V
+8.8V +3.3V GND DRIVE CONTROL UNDER UNDER
PROCESS C.B.A VEPW0060
P301 1 PREAMP OUT 2 GND
SD (B) SD (R)
Hss W.H.D. CP1 CP2 Vss
FADE REFERENCE VOLTAGE FADE IN/OUT VOLTAGE
P.B +8.8V +9V UNDER
P310 1 R 2 GND 3 B 4 GND 5 9V 6 CP2
P314 1 R 2 B 3 +8.8V
P311 1 R. AWC COMPENSATE 2 B. AWC COMPENSATE
P303 1 GND 2 NTSC
P313 +8.8V 1 +3.3V 2 GND 3 DRIVE 4 CONTROL 5 UNDER 6 UNDER 7
P309 ① NTSC 1 ② GND 2 ③ +9V 3 ⑧ UNDER 4
P302 GAIN UP SW 1 GAIN UP SW 2
CAMERA CABLE
TO EVF 10 PIN SOCKET
5 4 3 2 1
A B C D E F G

ORDER NO. VRD-8106-876

Service Manual

Color Video Camera

PK-801

Vol. 5

Exploded Views
Replacement Parts List

SPECIFICATIONS:

Power Source: DC 12 V ± 10%
AC 120V ± 10%, 60 Hz ± 0.5%
(with Power Supply Unit)
Power Consumption: (with E.V.F) DC 7.5W at 12V DC (Battery)
DC 0.7W at Standby
Special Tube System: 2/3″ frequency separation single tube system (built-in stripe filter)
Signal Carrier Frequency: 3.58 MHz
Focus System: Electro-static type
Lens Mounting: Built-in zoom lens (not "C" mount)
Lens: 6:1 zoom lens with auto/manual iris control.
Auto zoom lens and macro construction
F: 1.4, f: 12 mm—72 mm,
d: 1.3 m—infinity
Light Sensitivity: Minimum light intensity on optical image: 50 Lux (F: 1.4)
Optimum light intensity on optical image: 900 Lux
Video Output Level: 1.0 Vp-p, 75Ω (M type coaxial connector)
(Standard NTSC signal)
Sync. System: Internal Sync: RS-170
Signal to Noise Ratio: More than 43 dB
Horizontal Resolution: More than 240 lines
Color Temperature Control: 2 step switch (indoor, outdoor) & auto adjust

Microphone: Condenser Microphone
Audio Output Level: −20 dB, Hi-impedance
Audio Output Impedance: High impedance (1 KΩ)
External Microphone Input Impedance: 600Ω unbalanced
Electronic Viewfinder: Monochrome 1.5 inch CRT
Operating Temperature: 5°C to 35°C
Operating Humidity: 10% to 75%
Operating Position: Normal position only
Weight: Camera Head with E.V.F
6.3 lbs (with lens, 7 ft. cable & shoulder pad/handle grip)
AC adaptor (option)
2.4 lbs
Demensions: Camera Head with E.V.F
7″(W) × 8″(H) × 13″(D)
177 mm(W) × 210 mm(H) × 318 mm(D)
AC adaptor (option)
3″(W) × 3″(H) × 6″(D)
80 mm(W) × 75 mm(H) × 149 mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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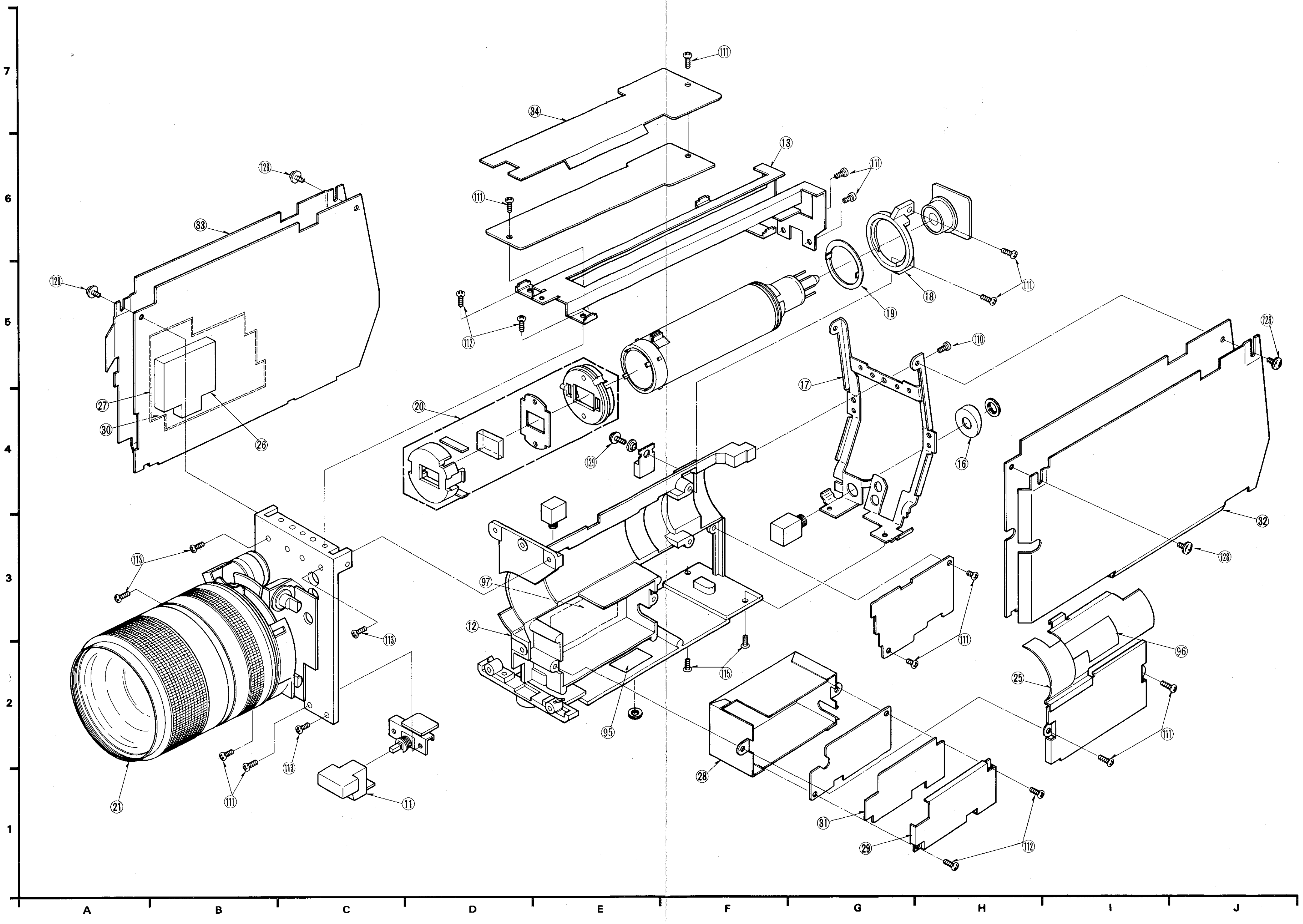
EXPLODED VIEW ❶ *Camera Unit Section*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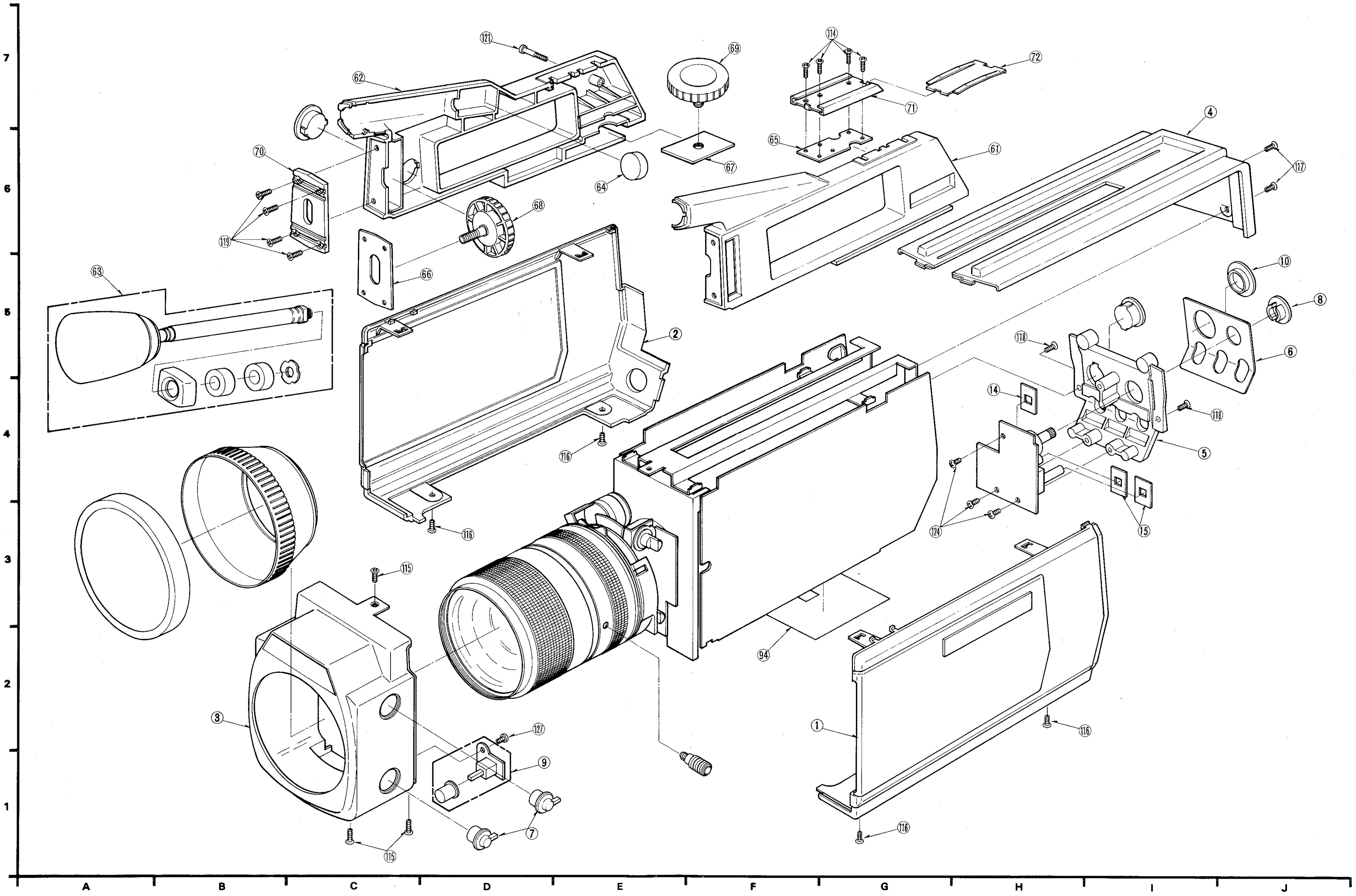
❷ Camera Unit Casing Parts Section



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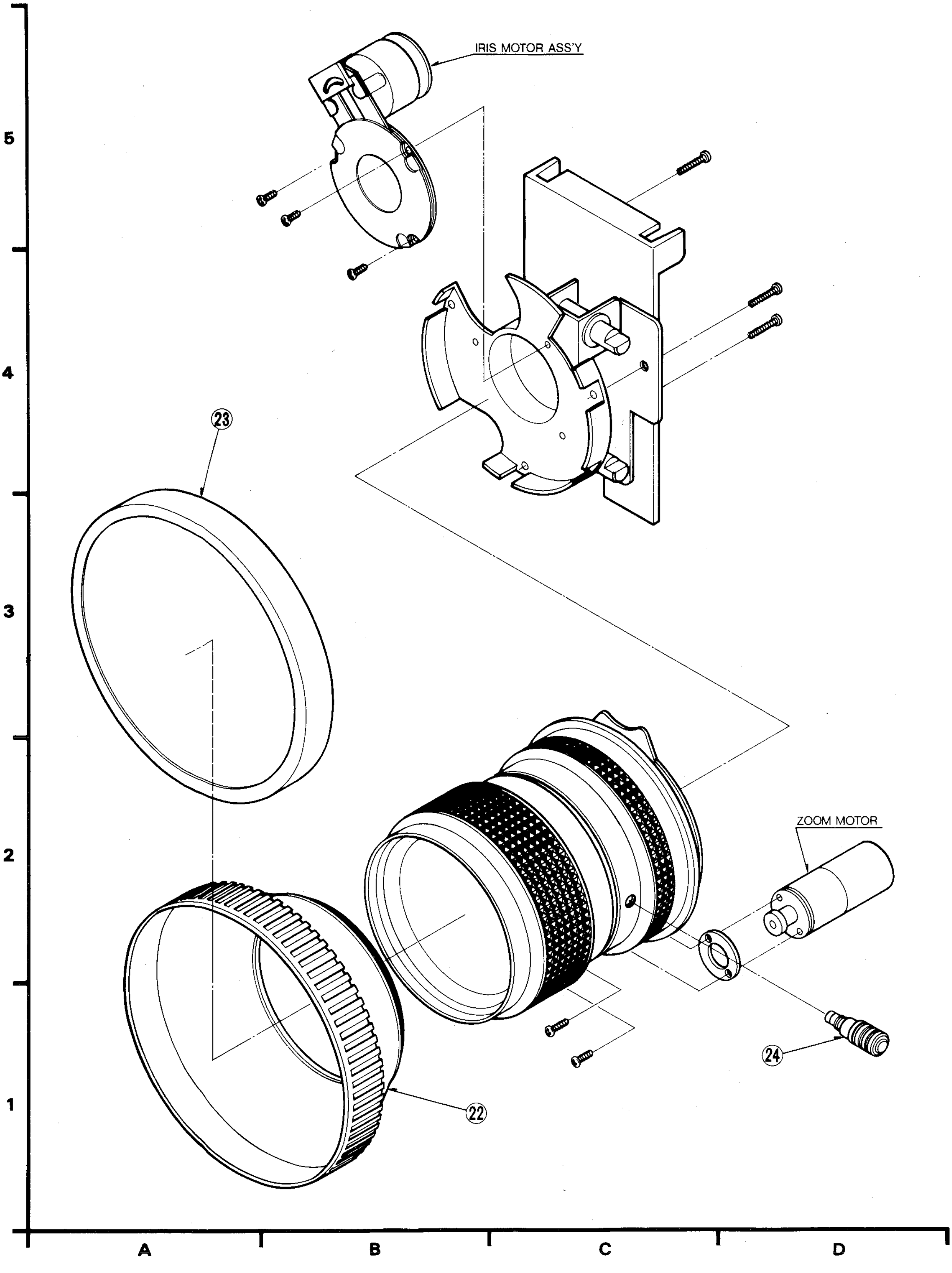
❸ Lens Section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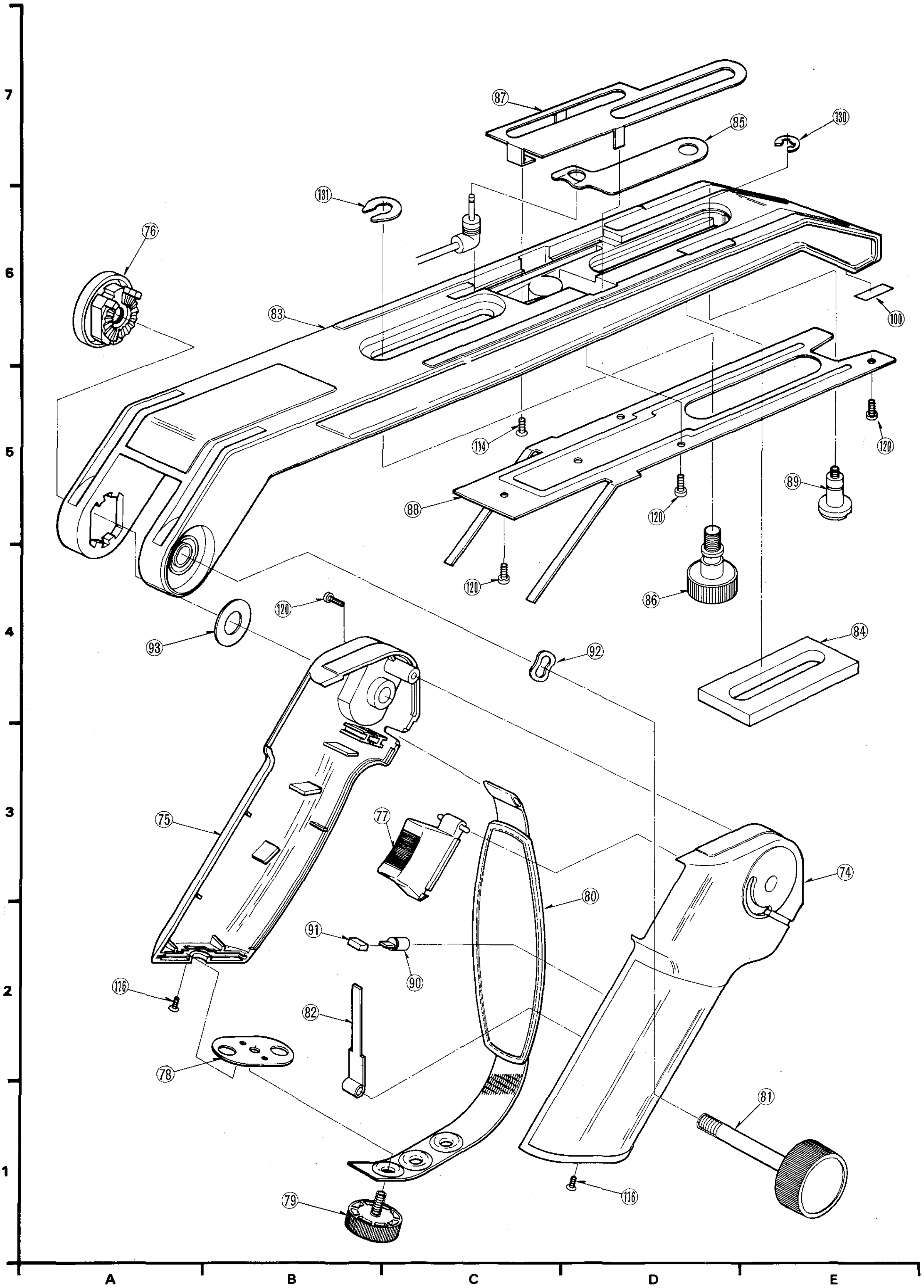
❹ *Shoulder Grip Unit Section*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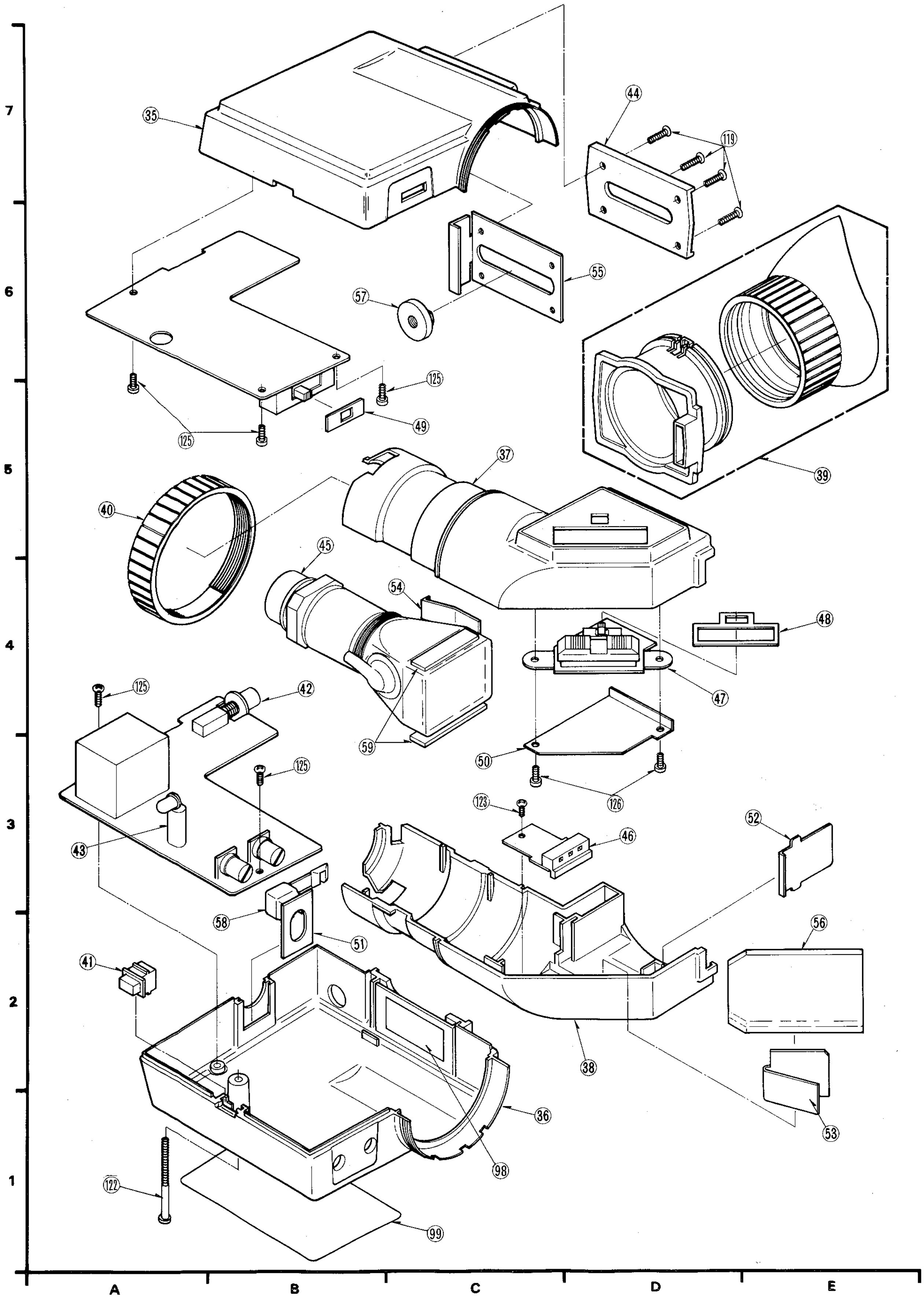
❺ Electronic Viewfinder Section



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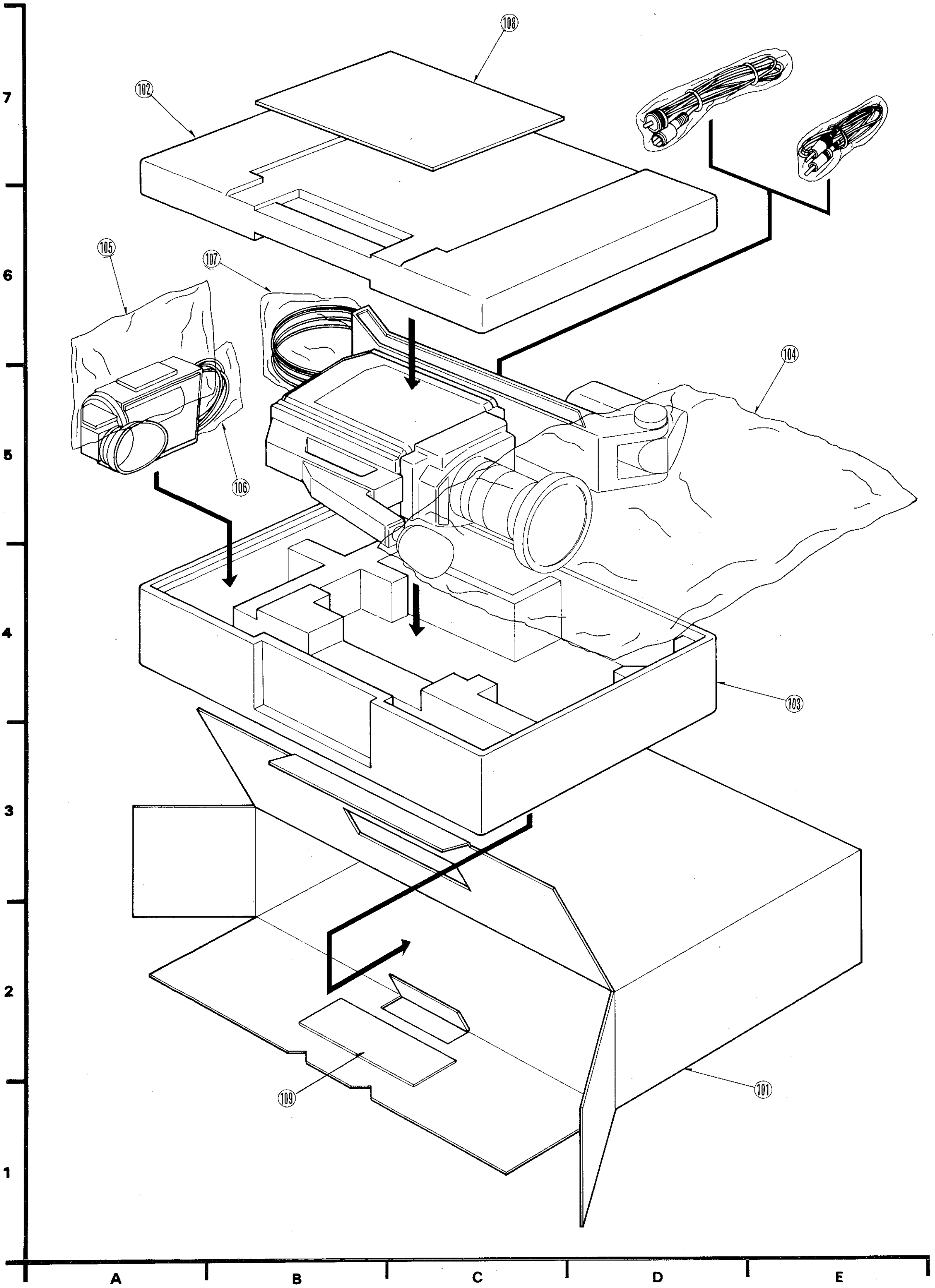
❻ *Packing Parts Section*



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MECHANICAL REPLACEMENT PARTS LIST

Note: *Be sure to make your orders of replacement parts according to this list.
○ . . . . Available replacement part
X . . . . Not available as replacement
☐ . . . . Only available on special order

Item No.	Drawing No.	Description	Pcs/ Set	Availa- bility	Part No.	Remark
		CSU				
1		RIGHT SIDE COVER ASS'Y	1	o	VYKW0172	
2		LEFT SIDE COVER ASS'Y	1	o	VYKW0173	
3		FRONT COVER ASS'Y	1	o	VYKW0162	
4		TOP COVER ASS'Y	1	o	VYKW0188	
5		REAR COVER	1	o	VKGW0136	
6		REAR PANEL	1	o	VGPW0100	
7		IRIS/FILTER KNOB	2	o	VGTW0017	
8		VOLUME KNOB	1	o	VGTW0027	
9		WB SW KNOB ASS'Y	1	o	VESW0006	
10		REMO. CON. CAP	1	o	VKGW0152	
11		REMO. CON. BUTTON	1	o	VGTW0021	
12		MAIN CHASSIS	1	o	VMKW0015	
13		TOP CHASSIS	1	o	VMAW0063	
14		STAND BY SPACER	1	o	VMXW0040	
15		FADE SPACER	2	o	VMXW0041	
16		EXT MIC SPACER	1	o	VMXW0042	
17		REAR CHASSIS	1	o	VMKW0017	
18		DY HOLDER (A)	1	o	VMDW0018	
19		DY HOLDER (B)	1	o	VMBW0017	
20		FILTER FIXTURE ASS'Y	1	o	VXEW0004	
21		6-MULTIPLE POWER ZOOM LENS	1	o	VFLW0030	
22		LENS HOOD	1	o	VKUW0036	
23		HOOD CAP	1	o	VKUW0037	
24		LENS LEVER	1	o	VMLW0009	
		CASE				
25		TARGET SHIELD COVER	1	o	VSCW0036	
26		14 MHz SHIELD CASE (A)	1	o	VSCW0034	
27		14 MHz SHIELD CASE (B)	1	o	VSCW0035	
28		PRE-AMP SHIELD CASE	1	o	VSCW0027	
29		PRE-AMP SHIELD CASE (D)	1	o	VSCW0020	
30		14 MHz FIBER SHEET	1	o	VMZW0033	
31		PRE-AMP FIBER SHEET (B)	1	o	VMZW0018	
32		BARRIER (A)	1	o	VMZW0034	
33		BARRIER (B)	1	o	VMZW0035	
34		FADE BARRIER	1	o	VMZW0039	
		SIDE EVF				
35		EVF TOP COVER ASS'Y	1	o	VYKW0135	
36		EVF BOTTOM COVER ASS'Y	1	o	VYKW0145	
37		CRT CASE (A) ASS'Y	1	o	VYKW0147	
38		CRT CASE (B) ASS'Y	1	o	VYKW0148	
39		EVF DOOR ASS'Y	1	o	VYKW0149	
40		EVF RING	1	o	VMDW0014	
41		TALLY DIFFUSION PIECE	1	o	VGQW0009	
42		TALLY SW BUTTON	1	o	VGTW0020	
43		TALLY LAMP HOLDER	1	o	VMGW0025	
44		EVF FIXING PIECE (A)	1	o	VMXW0033	
45		CRT FIXING BUSH	1	o	VMGW0016	
46		LED SPACER ASS'Y	1	o	VXFW0006	
47		POWER ZOOM SW ASS'Y	1	o	VEKW0176	
48		ZOOM SW SPACER	1	o	VMXW0038	
49		EVF TURNING SW SPACER	1	o	VMXW0037	
50		POWER ZOOM FIBER	1	o	VMZW0026	
51		CORD STOPPER CHASSIS	1	o	VMAW0050	
52		EVF SPRING	1	o	VMBW0012	
53		EVF MIRROR SPRING	1	o	VMBW0013	
54		GRAND SPRING	1	o	VMAW0051	
55		CASE FIXING ANGLE	1	o	VMAW0049	
56		EVF MIRROR	1	o	VMRW0001	
57		EVF MOVEABLE PIECE	1	o	VMXW0036	
58		CORD BUSH	1	o	VDBW0004	
59		EVF CRT CUSHION	1	o	VMGW0026	
60		HANDLE UNIT	1	o	(VYHW0038)	
61		RIGHT HANDLE	1	o	VKHW0024	
62		LEFT HANDLE	1	o	VKHW0025	
63		MIC KIT	1	o	VXMW0017	
64		MIC SPONGE (B)	1	o	VMFW0012	
65		SHOE FIXING CHASSIS	1	o	VMKW0018	
66		HANDLE FIXING ANGLE (A)	1	o	VMAW0047	
67		HANDLE FIXING ANGLE (B)	1	o	VMAW0048	
68		HANDLE KNOB (A)	1	o	VGTW0018	
69		HANDLE KNOB (B)	1	o	VGTW0019	
70		HANDLE FIXING PIECE (B)	1	o	VMXW0034	
71		ACCESSORIES SHOE	1	o	VGQW0012	
72		SHOE SPRING	1	o	VMBW0015	
		SHOULDER GRIP				
73		SHOULDER GRIP UNIT	1	o	(VYHW0035)	
74		RIGHT SHOULDER GRIP	1	o	VKHW0022	
75		LEFT SHOULDER GRIP ASS'Y	1	o	VYHW0039	
76		SHAFT COVER ASS'Y	1	o	VYFW0001	
77		REMO. CON. BUTTON	1	o	VGTW0025	
78		STRAP FIXING ANGLE	1	o	VHDW0017	
79		STRAP SCREW	1	o	VHDW0015	
80		HAND STRAP	1	o	VFBW0006	
81		ROCK KNOB	1	o	VGTW0024	
82		REMO. CON. SPRING	1	o	VMBW0011	
83		SHOULDER	1	o	VKHW0026	
84		CUSHION C	1	o	VMFW0010	
85		JOINT PLATE	1	o	VMAW0058	
86		SHOULDER SCREW	1	o	VMSW0014	
87		COSMETIC PLATE (A)	1	o	VMAW0059	
88		COSMETIC PLATE (B)	1	o	VMAW0060	
89		HANDLE ROLLER	1	o	VMSW0013	
90		REMO. CON. SWITCH	1	o	KBM-801C	
91		SWITCH RUBBER	1	o	VMGW0009	
92		WAVE WASHER	1	o	WW-8	
93		SHOCK ABSORBING PLATE	1	o	VMZW0041	
		LABEL				
94		CAUTION LABEL	1	o	VQLW0201	
95		CSU CHASSIS LABEL	1	o	VQLW0074	
96		CAUTION LABEL (D)	1	o	VQLW0106	
97		ATTENTION LABEL	1	o	VQLW0167	
98		EVF CHASSIS LABEL	1	o	VQLW0074	
99		CAUTION LABEL	1	o	VQLW0184	
100		SHOULDER LABEL	1	o	VQLW0186	
		PACKING CASE				
101		PACKING CASE	1	o	VPKW0099	
102		CUSHION TOP	1	o	VPGW0049	
103		CUSHION BOTTOM	1	o	VPGW0050	
104		POLY BAG FOR CAMERA HEAD	1	o	XZB36X55A02	
105		POLY BAG FOR EVF	1	o	XZB22X42A02	
106		POLY BAG FOR EVF CABLE	1	o	XZB10X15A02	
107		POLY BAG FOR CAMERA CABLE	1	o	XZB15X28A02	
108		FAN BAG KIT	1	o	VQFW0054	
109		HANDLE KIT	1	o	VYHW0003	
		SCREW				
110		BIND SCREW 3φx6mm	1	o	XSB3+6FXK	
111		3φx6mm	12	o	XSB3+6FU	
112		2.6φx4mm	4	o	XSB26+4FU	
113		PAN HEAD MACHINE SCREW				
		3φx8mm	4	o	XSN3+8FU	
114		FLUSH HEAD MACHINE SCREW				
		2φx6.8mm	5	o	XSS2+68FXK	
115		3φx6mm	5	o	XSS3+6FU	
116		3φx6mm	6	o	XSS3+6FXK	
117		3φx14mm	2	o	XSS3+14FXK	
118		2.6φx5mm	2	o	XSS26+5FU	
119		2.6φx6mm	8	o	XSS26+6FXK	

Item No.	Drawing No.	Description	Pcs/ Set	Availa-bility	Part No.	Remark
120		BIND TAPPING SCREW				
		3φx8mm	4	o	XTB3+8GFXK	
121		3φx20mm	1	o	XTB3+20GFXK	
122		3φx35mm	1	o	XTB3+35GFXK	
123		PAN HEAD TAPPING SCREW				
		2φx4mm	1	o	XTN2+4GFU	
124		3φx8mm	3	o	XTN3+8GFU	
125		2.6φx6mm	5	o	XTN26+6GFU	
126		2.6φx6mm	2	o	XTN26+6GFXK	
127		2.6φx10mm	1	o	XTN26+10GFU	
128		PAN HEAD WITH WASHER ASS'Y				
		3φx8mm	4	o	XYN3+B8FU	
129		3φx8mm	1	o	XYN3+F8FU	
130		E RING 6φ	1	o	XUC6FXK	
131		U RING 6φ	1	o	XUE6FXK	

ELECTRICAL REPLACEMENT PARTS LIST

Note:

1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
   Components identified by shade have special characteristics important for safety. When replacing any of these components, use only the original ones.
3. Unless otherwise specified:
   All resistors are in OHMS (Ω), 1/4w, ±5% carbon, K = 1,000 Ω, M = 1,000 KΩ
   All capacitors are in MICROFARADS (μF), ±10%, P = μμF.
   All coils are in MICROHENRIES (μH), $m = 10^{3}$
4. C.B.A: Circuit Board Assembly.
5. C.B: Circuit Board.

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VEPW0023A	PRE-AMP C.B.A.	1	
		VEPW0060B	PROCESS C.B.A.	1	
		VEPW0061B	DEFLECTION C.B.A.	1	
		VEPW0062	A.W.C C.B.A.	1	
		VEPW0063	A.L.C C.B.A.	1	
		VEPW0064	FADER C.B.A.	1	
		VEPW0065	REAR SIDE C.B.A.	1	
		VEPW0066	A.W.C SW C.B.A.	1	
		VEPW0067	REMO. CON. SW C.B.A.	1	
		VEPW0071	EVF H. C.B.A.	1	
		VEPW0072	EVF V. C.B.A.	1	
		VEPW0073	EVF LED. C.B.A.	1	
		VEPW0083	SPECIAL TUBE SOCKET C.B.A.	1	
		VEPW0075	ZOOM SW. C.B.A.	1	
		VEPW0089A	BIAS LIGHT C.B.A.	1	
		VEPW0089B	BIAS LIGHT C.B.A.	1	
			PRE-AMP C.B.A.		
			Integrated Circuit		
IC201		K720A72F		1	
			Transistor		
Q201		2SK218(Q)		1	
			Diode		
D201		MA26		1	
			Resistors		
R201		ERD25TJ565	1/4W 5.6M	1	
R202		ER050CKF2704	1/2W 2.7M	1	
R203		ERD10TJ124	120K	1	
R204		ERD10TJ181	180	1	
R205		ERD10TJ561	560	1	
R206		ERD10TJ104	100K	1	
R207		ERD10TJ682	6.8K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Capacitors		
C201		VCAMX100V223K	Mylar 100V 0.022	1	
C202		ECQE1104KN	Mylar 100V 0.1	1	
C203		ECSF6E47	Tantalum 6.3V 47	1	
C204		ECSF10E47	Tantalum 10V 47	1	
C205		VCAMX50V102K	Mylar 50V 0.001	1	
C206		ECSF10E10	Tantalum 10V 10	1	
C207		ECSF10E47	Tantalum 10V 47	1	
C208		ECSF10E10	Tantalum 10V 10	1	
C209		ECSF35ER47	Tantalum 35V 0.47	1	
C210		ECCW1H080CC5	Ceramic 50V 8P	1	
C211		ECCW1H470JC5	Ceramic 50V 47P	1	
C212		ECV1ZW40X53N	Trimmer 1W 40P	1	
			Coils		
L201		ELT-12R004	270μH	1	
L202		EL0606SK-101K	100μH	1	
		VEKW0206	2P Connector Ass'y	1	
		VEKW0216	3P Connector Ass'y	1	
			PROCESS C.B.A.		
			Integrated Circuits		
IC301		AN6041		1	
IC302		KK11A66A or	Hi-Mic	1	
		EHM-KK11A66A			
IC303		AN6040		1	
IC304		K721W44 or	Hi-Mic	1	
		EHM-K721W44			
IC305		AN6011		1	
IC306		MN6064		1	
IC307		AN6553		1	
IC308		AN6031		1	
IC309		KK14W31 or	Hi-Mic	1	
		EHM-KK14W31			
IC310		AN6020		1	
			Transistors		
Q301		2SD636(Q,R)		1	
Q302-304		2SC2206(C)		3	
Q305		2SD636(Q,R)		1	
Q306		2SC2206(C)		1	
Q307		2SD661(T)		1	
Q308,309		2SB641(Q.R)		1	
Q310		2SD636(Q,R)		1	
Q311		2SD636(Q,R)		1	
Q312		2SD636(Q,R)		1	
Q313		2SC2377(C.D)		1	
Q314		2SD636(Q,R)		1	
		or 2SC1684(Q,R)			
Q315		2SD636(Q,R)		1	
Q316		2SB641(Q.R)		1	
Q317-322		2SD636(Q,R)		6	
Q323		2SB641(Q.R)		1	
Q324,325		2SD636(Q.R)		2	
Q326		2SC2377(C.D)		1	
Q327		2SD636(Q,R)		1	
Q328		2SA838(B,C)		1	
Q329		2SD636(Q,R)		1	
Q331		2SC2377(C,D)		1	
Q333		2SC2377(C,D)		1	
Q334		2SB641(Q.R)		1	
Q335		2SD636(Q,R)		1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Diodes		
D301-304		MA165		4	
D305		OA91		1	
D306		MA165		1	
D307		MZ303A		1	
D308		MA165		1	
D323		MA165		1	
D326		OA91		1	
			Resistors		
R301		ERD10TJ272	2.7K	1	
R302		ERD10TJ222	2.2K	1	
R303		ERD10TJ332	3.3K	1	
R304		ERD10TJ561	560	1	
R305		ERD10TJ392	3.9K	1	
R306		ERD10TJ561	560	1	
R307		ERD10TJ102	1K	1	
R308		ERD10TJ472	4.7K	1	
R309		ERD10TJ562	5.6K	1	
R310		ERD10TJ152	1.5K	1	
R311		ERD10TJ122	1.2K	1	
R312		ERD10TJ822	8.2K	1	
R313		ERD10TJ561	560	1	
R314		ERD10TJ272	2.7K	1	
R315		ERD10TJ182	1.8K	1	
R316		ERD10TJ271	270	1	
R317		ERD10TJ822	8.2K	1	
R318,319		ERD10TJ472	4.7K	2	
R320		ERD10TJ682	6.8K	1	
R321		ERD10TJ152	1.5K	1	
R322		ERD10TJ102	1K	1	
R323		ERD10TJ472	4.7K	1	
R324,325		ERD10TJ682	6.8K	2	
R326		ERD10TJ562	5.6K	1	
R327		ERD10TJ331	330	1	
R328		ERD10TJ562	5.6K	1	
R330		ERD10TJ103	10K	1	
R331		ERD10TJ153	15K	1	
R332		ERD10TJ103	10K	1	
R333		ERD10TJ562	5.6K	1	
R334		ERD10TJ222	2.2K	1	
R335		ERD10TJ561	560	1	
R336		ERD10TJ680	68	1	
R337,338		ERD10TJ222	2.2K	2	
R339		ERD10TJ223	22K	1	
R340		ERD10TJ103	10K	1	
R341,342		ERD10TJ561	560	2	
R343		ERD10TJ391	390	1	
R344		ERD10TJ333	33K	1	
R345		ERD10TJ562	5.6K	1	
R346		ERD10TJ102	1K	1	
R347,348		ERD10TJ332	3.3K	2	
R349		ERD10TJ123	12K	1	
R350		ERD10TJ332	3.3K	1	
R351		ERD10TJ561	560	1	
R352		ERD10TJ331	330	1	
R353		ERD10TJ152	1.5K	1	
R354		ERD10TJ562	5.6K	1	
R355		ERD10TJ182	1.8K	1	
R356		ERD10TJ102	1K	1	
R357		ERD10TJ561	560	1	
R358		ERD10TJ821	820	1	
R359		ERD10TJ103	10K	1	
R360		ERD10TJ822	8.2K	1	
R361,362		ERD10TJ103	10K	2	
R363		ERD10TJ473	47K	1	
R364		ERD10TJ821	820	1	
R365		ERD10TJ102	1K	1	
R366		ERD10TJ152	1.5K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R367		ERD10TJ221	220	1	
R368		ERD10TJ124	120K	1	
R369		ERD10TJ104	100K	1	
R371		ERD10TJ103	10K	1	
R372		ERD10TJ560	56	1	
R373		ERD10TJ103	10K	1	
R374		ERD10TJ684	680K	1	
R376		ERD10TJ223	22K	1	
R378		ERD10TJ821	820	1	
R379		ERD10TJ102	1K	1	
R380		ERD10TJ182	1.8K	1	
R381,382		ERD10TJ102	1K	2	
R383		ERD10TJ104	100K	1	
R384,385		ERD10TJ471	470	2	
R386		ERD10TJ822	8.2K	1	
R387		ERD10TJ181	180	1	
R388		ERD10TJ822	8.2K	1	
R389,390		ERD10TJ102	1K	2	
R392-395		ERD10TJ102	1K	4	
R397,398		ERD10TJ102	1K	2	
R399		ERD10TJ562	5.6K	1	
R3100		ERD10TJ121	120	1	
R3101		ERD10TJ681	680	1	
R3102		ERD10TJ122	1.2K	1	
R3103		ERD10TJ222	2.2K	1	
R3104		ERD10TJ223	22K	1	
R3105		ERD10TJ101	100	1	
R3106		ERD10TJ222	2.2K	1	
R3107		ERD10TJ153	15K	1	
R3108		ERD10TJ681	680	1	
R3109		ERD10TJ100	10	1	
R3111		ERD10TJ102	1K	1	
R3112		ERD10TJ153	15K	1	
R3113		ERD10TJ681	680	1	
R3114		ERD10TJ821	820	1	
R3115		ERD10TJ823	82K	1	
R3116		ERD10TJ122	1.2K	1	
R3117		ERD10TJ153	15K	1	
R3118		ERD10TJ472	4.7K	1	
R3119		ERD10TJ122	1.2K	1	
R3120		ERD10TJ392	3.9K	1	
R3121		ERD10TJ222	2.2K	1	
R3122		ERD10TJ103	10K	1	
R3123		ERD10TJ273	27K	1	
R3124		ERD10TJ562	5.6K	1	
R3125		ERD10TJ103	10K	1	
R3126		ERD10TJ272	2.7K	1	
R3128		ERD10TJ471	470	1	
R3129		ERD10TJ121	120	1	
R3130		ERD10TJ680	68	1	
R3131		ERD10TJ562	5.6K	1	
R3132		ERD10TJ152	1.5K	1	
R3133		ERD10TJ102	1K	1	
R3134		ERD10TJ152	1.5K	1	
R3135		ERD10TJ102	1K	1	
R3136		ERD10TJ105	1M	1	
R3137		ERD10TJ561	560	1	
R3138		ERD10TJ222	2.2K	1	
R3139		ERD10TJ272	2.7K	1	
R3140		ERD10TJ102	1K	1	
R3142		ERD10TJ105	1M	1	
R3143		ERD10TJ561	560	1	
R3144		ERD10TJ472	4.7K	1	
R3145,3146		ERD10TJ561	560	2	
R3148,3149		ERD10TJ272	2.7K	2	
R3150		ERD10TJ561	560	1	
R3151		ERD10TJ223	22K	1	
R3152		ERD10TJ822	8.2K	1	
R3153		ERD10TJ392	3.9K	1	
R3154		ERD10TJ472	4.7K	1	
R3155		ERD10TJ333	33K	1	
R3156,3157		ERD10TJ561	560	2	
R3158		ERD10TJ272	2.7K	1	
R3159		ERD10TJ331	330	1	
R3160		ERD10TJ681	680	1	
R3161		ERD10TJ223	22K	1	
R3162		ERD10TJ272	2.7K	1	
R3163		ERD10TJ473	47K	1	
R3164		ERD10TJ102	1K	1	
R3165		ERD10TJ102	1K	1	
R3166		ERD10TJ222	2.2K	1	
R3167		ERD10TJ183	18K	1	
R3169		ERD10TJ223	22K	1	
R3170		ERD10TJ472	4.7K	1	
R3171		ERD10TJ561	560	1	
R3186		ERD10TJ562	5.6K	1	
R3188		ERD10TJ102	1K	1	
R3192		ERD10TJ822	8.2K	1	
R3193,3194		ERD10TJ272	2.7K	2	
R3195		ERD10TJ222	2.2K	1	
R3196		ERD10TJ473	47K	1	
R3197		ERD10TJ222	2.2K	1	
R3202		ERD10TJ183	18K	1	
R3203		ERD10TJ183	18K	1	
R3204		ERD10TJ102	1K	1	
R3208		ERD10TJ184	180K	1	
R3209		ERD10TJ471	470	1	
R3217		ERD10TJ222	2.2k	1	
R3218		EFD2FHJ332S	Thermistor 3.3K	1	
R3219		ERD10TJ562	5.6K	1	
R3220		ERD10TJ274	270K	1	
			Variable Resistors		
VR301		EVN38CA00B14	10K	1	
VR302		EVN38CA00B53	5K	1	
VR303		EVN38CA00B13	1K	1	
VR304		EVN38CA00B33	3K	1	
VR305		EVN38CA00B52	500	1	
VR306		EVN38CA00B14	10K	1	
VR307		EVN38CA00B52	500	1	
VR308-311		EVN38CA00B14	10K	4	
VR312		EVN38CA00B13	1K	1	
VR313		EVN38CA00B15	100K	1	
VR315		EVN38CA00B15	100K	1	
VR316		EVN38CA00B52	500	1	
VR317,318		EVN38CA00B52	500	2	
VR319		EVN38CA00B33	3K	1	
VR320		EVN38CA00B15	100K	1	
VR321		EVN38CA00B52	500	1	
VR322		EVN38CA00B33	3K	1	
VR323		EVN38CA00B15	100K	1	
VR324		EVN38CA00B34	30K	1	
			Capacitors		
C301		ECEA1AK330	Electrolytic 10V 33	1	
C302		ECQV05103JZ	Mylar 50V 0.01	1	
C303		ECCR1H220J	Ceramic 50V 22P	1	
C304		ECQV05103JZ	Mylar 50V 0.01	1	
C305		ECCR1H220J	Ceramic 50V 22P	1	
C306		ECEA1EK100	Electrolytic 25V 10	1	
C307		ECEA1AK330	Electrolytic 10V 33	1	
C308		ECEA1AK470	Electrolytic 10V 47	1	
C309		ECEA1CK100	Electrolytic 16V 10	1	
C310		ECEA1AK330	Electrolytic 10V 33	1	
C311		ECEA0JK470	Electrolytic 6.3V 47	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C312		ECEA1HK010	Electrolytic 50V 1	1	
C313		ECCR1H270J5	Ceramic 50V 27P	1	
C314		ECEA0JK470	Electrolytic 6.3V 47	1	
C315		ECEA1AK220	Electrolytic 10V 22	1	
C316,317		ECEA0JK470	Electrolytic 6.3V 47	2	
C318		ECEA1AK470	Electrolytic 10V 47	1	
C320		ECCR1H820J5	Ceramic 50V 82P	1	
C321		ECEA1CK100	Electrolytic 16V 10	1	
C322		ECSF10E47	Tantalum 10V 47	1	
C323		ECCW1H080CC5	Ceramic 50V 8P	1	
C324,325		ECKR1H103ZF5	Ceramic 50V 0.01	2	
C326		ECV1ZW20X64	Trimmer 1W 20P	1	
C327,328		ECEA1HK010	Electrolytic 50V 1	2	
C331,332		ECEA1AK330	Electrolytic 10V 33	2	
C333		ECQV05103JZ	Mylar 50V 0.01	1	
C334		ECQM1H103MZ	Mylar 50V 0.01	1	
C335		ECQV05103JZ	Mylar 50V 0.01	1	
C336		ECQM1H103MZ	Mylar 50V 0.01	1	
C337		ECKR1H103ZF5	Ceramic 50V 0.01	1	
C339		ECKW1H561KB2	Ceramic 50V 560	1	
C340		ECQM1H103MZ	Mylar 50V 0.01	1	
C341		ECEA1AK330	Electrolytic 10V 33	1	
C342,343		ECEA0JK470	Electrolytic 6.3V 47	2	
C345		ECQV05563JZ	Mylar 50V 0.056	1	
C346		ECEA1AK470	Electrolytic 10V 47	1	
C347		ECEA1CK100	Electrolytic 16V 10	1	
C348		ECSF10E10	Tantalum 10V 10	1	
C349		ECSF16ER15	Tantalum 16V 0.15	1	
C350		ECEA0JK470	Electrolytic 6.3V 47	1	
C351		ECEA1AK330	Electrolytic 10V 33	1	
C352,353		ECCR1H820J5	Ceramic 50V 82P	2	
C354		ECKR1H103ZF5	Ceramic 50V 0.01	1	
C355		ECEA1AK330	Electrolytic 10V 33	1	
C356		ECCR1H270J5	Ceramic 50V 27P	1	
C357		ECV1ZW40X53N	Trimmer 1W 40P	1	
C358,359		ECCR1H820JC5	Ceramic 50V 82P	2	
C360-363		ECCR1H820J5	Ceramic 50V 82P	4	
C364		ECKR1H102KB5	Ceramic 50V 0.001	1	
C365,366		ECEA0JK470	Electrolytic 6.3V 47	2	
C367		ECCR1H470J5	Ceramic 50V 47P	1	
C368		ECCR1H151J5	Ceramic 50V 150P	1	
C369		ECCR1H271J	Ceramic 50V 270P	1	
C370,371		ECEA0JK470	Electrolytic 6.3V 47	2	
C372		ECCR1H820J5	Ceramic 50V 82P	1	
C373		ECEA1AK470	Electrolytic 10V 47	1	
C374		ECEA1HK010	Electrolytic 50V 1	1	
C375		ECEA1AK330	Electrolytic 10V 33	1	
C376		ECEA16N10U	Electrolytic 16V 10	1	
C377		ECSF35ER47	Tantalum 35V 0.47	1	
C378		ECEA0JK470	Electrolytic 6.3V 47	1	
C379		ECEA1HN1U	Electrolytic 50V 1	1	
C380		ECEA1CK100	Electrolytic 16V 10	1	
C381		ECQM1H103MZ	Mylar 50V 0.01	1	
C382		ECEA1ASS471	Electrolytic 10V 470	1	
C383		ECEA1HK010	Electrolytic 50V 1	1	
C384,385		ECCR1H121JC5	Ceramic 50V 120P	2	
C387		ECCR1H100D5	Ceramic 50V 10P	1	
C388		VCAMS50V103M	Mylar 50V 0.01	1	
C389		ECCR1H820J5	Ceramic 50V 82P	1	
C390		ECSF10E47	Tantalum 10V 47	1	
C391		ECCR1H270J5	Ceramic 50V 27P	1	
C392		ECQM1H103MZ	Mylar 50V 0.01	1	
C393		ECCR1H820J5	Ceramic 50V 82P	1	
C394		ECQM1H103MZ	Mylar 50V 0.01	1	
C396		ECEA1ASS101	Electrolytic 10V 100	1	
C397		ECEA0JK470	Electrolytic 6.3V 47	1	
C398		ECEA1ASS101	Electrolytic 10V 100	1	
C399		ECEA0JK470	Electrolytic 6.3V 47	1	
C3100		ECEA1CK100	Electrolytic 16V 10	1	
C3102		ECEA1AK330	Electrolytic 10V 33	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C3103		ECEA1HKR47	Electrolytic 50V 0.47	1	
C3104-3106		ECEA1AK330	Electrolytic 10V 33	3	
C3107		ECEA1HKR47	Electrolytic 50V 0.47	1	
C3108		ECKW1H561KB2	Ceramic 50V 560	1	
C3112		ECEA1HKNR47	Electrolytic 50V 0.47	1	
C3120		ECCR1H331J	Ceramic 50V 330P	1	
C3126		ECKR1H103ZF5	Ceramic 50V 0.01	1	
C3130		ECEA1AK470	Electrolytic 10V 47	1	
C3131		ECSF10E10	Tantalum 10V 10	1	
			Coils		
L301-303		EL0606SK-150K	15μH	3	
L305		EL0606SK-101K	100μH	1	
L307,308		EL0606SK-150K	15μH	2	
L309		EL0606SK-331K	330μH	1	
L310		EL0606SK-101K	100μH	1	
L311		EL0606SK-151K	150μH	1	
L312		TLT102-999G	1mH	1	
L313		EL0606SK-101K	100μH	1	
L314		VLQ7H101K	100μH	1	
L315		EL0606SK-270K	27μH	1	
L316		VLQ7H101K	100μH	1	
L317		EL0606SK-150K	15μH	1	
L318		EL0606SK-270K	27μH	1	
L319,320		EL0606SK-150K	15μH	2	
L321,322		EL0606SK-151K	150μH	2	
			Filters		
LC301		ELB5E006		1	
LC302		ELB5F002		1	
LC303		ELT7F004		1	
LC304,305		ELB5E005		2	
X301		EFCA3R58MB3	Ceramic Trap	1	
X302		VSXK0065	X'Tal	1	
		VEKW0207	2P Connector Ass'y	1	
		VEKW0210	2P Connector Ass'y	1	
		VEKW0211	2P Connector Ass'y	1	
		VEKW0224	4P Connector Ass'y	1	
		VEKW0227	5P Connector Ass'y	1	
			Delay Line		
DL301		EFD-PN645B85B		1	
DL302		ELB-5F013		1	
DL303		ELB-5E013		1	
DL304		EFD-MN645B85B		1	
			Short Plug		
P301-303		EMCS0252M	2P	3	
P309		EMCS0452M	4P	1	
P310		EMCS0652M	6P	1	
P313		EMCS0752M	7P	1	
P314		EMCS0352M	3P	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			DEFLECTION C.B.A.		
			Integrated Circuits		
IC601		AN6050		1	
IC602		AN374P		1	
IC603		MN6069		1	
			Transistor		
Q602		2SD636(Q,R)		1	
Q603		2SB641(Q,R)		1	
Q604		2SC1565A(Q,R)		1	
Q606		2SD662(Q,R)		1	
Q607		2SD636(Q,R)		1	
Q608		2SA1018(Q,R)		1	
Q609		2SD662(Q,R)		1	
Q610		2SB641(Q,R)		1	
Q611		2SB641(Q,R)		1	
Q612		2SD662(Q,R)		1	
Q613		2SD636(Q,R)		1	
Q614		2SA1018(Q,R)		1	
Q615		2SB642(Q,R)		1	
Q616		2SD636(Q,R)		1	
Q617		2SB641(Q,R)		1	
Q618		2SB641(Q,R)		1	
		or 2SA564(Q,R)			
Q619		2SB641(Q,R)		1	
Q620		2SD662(R)		1	
Q621		2SB641(Q,R)		1	
		or 2SA564(Q,R)			
Q622		2SD669A		1	
Q623		2SD636(Q,R)		1	
Q624		2SD636(Q,R)		1	
Q625		2SD636(R)		1	
Q626		2SD636(R)		1	
		or 2SD603(R)			
Q632		2SB641(S,T)		1	
Q633		2SD636(R,S)		1	
Q634		2SD636(R,S)		1	
Q635		2SD636(Q,R)		1	
Q636		2SD639(Q,R)		1	
Q638		2SA684(R,S)		1	
Q639		2SD661(T,U)		1	
Q640		2SD661(T,U)		1	
Q645		2SB641(Q,R)		1	
		or 2SA564(Q,R)			
Q648		2SB641(Q,R)		1	
		or 2SA564(Q,R)			
Q650		2SD636(Q,R)		1	
		or 2SC1684(Q,R)			
Q651		2SB641(Q,R)		1	
		or 2SA564(Q,R)			
Q652		2SD636(Q,R)		1	
		or 2SC1684(Q,R)			
Q653		2SD636(Q,R)		1	
			Diodes		
D601		MA165		1	
D602		ERB28-04D		1	
D603		ERB28-06D		1	
D604,605		ERB28-04D		2	
D606-608		MA165		3	
D609		MZL306B		1	

Ref No.		Part No.	Part Name & Description	Pcs / Set	Remarks
D610,611		ERB12-01		2	
D612		RD6.2E		1	
D614		MA165		1	
D619		MA165		1	
D626		MA165		1	
			Resistors		
R601		ERD10TJ683	68K	1	
R605		ERD10TJ681	680	1	
R606		ERD10TJ222	2.2K	1	
R607		ER050CKF5603	1/2W 560K	1	
R608		ERD10TJ224	220K	1	
R609		ERD10TJ823	82K	1	
R610		ERD10TJ102	1K	1	
R611		ERD10TJ472	4.7K	1	
R612		ERD10TJ331	330	1	
R613		ERD10TJ100	10	1	
R614		ERD10TJ390	39	1	
R615		ERD10TJ682	6.8K	1	
R616		ERD10TJ103	10K	1	
R617		ERD10TJ682	6.8K	1	
R618		ERD10TJ334	330K	1	
R620		ERD10TJ223	22K	1	
R621		ERD10TJ104	100K	1	
R628,629		ERD10TJ682	6.8K	2	
R630		ERD10TJ182	1.8K	1	
R631		ERD10TJ392	3.9K	1	
R632		ERD10TJ123	12K	1	
R633		ERD10TJ473	47K	1	
R634		ERD10TJ333	33K	1	
R635		ERD10TJ682	6.8K	1	
R636		ERD10TJ822	8.2K	1	
R637		ERD10TJ182	1.8K	1	
R638		ERD10TJ333	33K	1	
R639		ERD10TJ472	4.7K	1	
R640		ERD10TJ102	1K	1	
R641		ERD10TJ223	22K	1	
R642		ERD10TJ273	27K	1	
R643		ERD10TJ822	8.2K	1	
R644		ERD10TJ472	4.7K	1	
R645		ERD10TJ153	15K	1	
R646		ERD10TJ472	4.7K	1	
R647		ERD10TJ103	10K	1	
R648,649		ERD10TJ272	2.7K	2	
R650,651		ERD10TJ472	4.7K	2	
R652		ERD10TJ153	15K	1	
R653		ERD10TJ272	2.7K	1	
R654		ERD10TJ103	10K	1	
R655		ERD10TJ272	2.7K	1	
R656		ERD10TJ472	4.7K	1	
R657		ERD10TJ333	33K	1	
R658,659		ERD10TJ472	4.7K	2	
R660		ERD10TJ223	22K	1	
R661		ERD10TJ331	330	1	
R662		ERD10TJ272	2.7K	1	
R663		ERD10TJ153	15K	1	
R664		ERD12TJ180 or	1/2W 18	1	
		ERD50TJ180			
R665		ERD10TJ222	2.2K	1	
R666		ERD10TJ183	18K	1	
R667		ERD10TJ562	5.6K	1	
R668		ERD10TJ102	1K	1	
R669		ERD10TJ223	22K	1	
R670		ERD10TJ221	220	1	
R671		ERD10TJ560	56	1	
R672		ERD10TJ220	22	1	
R673		ERD10TJ101	100	1	
R674		ERD10TJ332	3.3K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R675		ERD10TJ472	4.7K	1	
R676		ERD10TJ152	1.5K	1	
R677		ERD10TJ104	100K	1	
R678		ERD10TJ124	120K	1	
R679		ERD10TJ272	2.7K	1	
R680		ERD10TJ103	10K	1	
R687		ERD10TJ682	6.8K	1	
R688		ERD10TJ222	2.2K	1	
R689		ERD10TJ562	5.6K	1	
R690		ERD10TJ392	3.9K	1	
R691		ERD10TJ562	5.6K	1	
R692		ERD10TJ823	82K	1	
R693		ERD25TJ471	1/4W 470	1	
R695		ERD10TJ223	22K	1	
R696		ERD10TJ332	3.3K	1	
R697		ERD10TJ103	10K	1	
R698		ERD10TJ330	33	1	
R699		ERG1ANJ101	1W 100	1	
R6100		ERD10TJ472	4.7K	1	
R6105		ERD10TJ562	5.6K	1	
R6106		ERD10TJ181	180	1	
R6107		ERD10TJ333	33K	1	
R6108		ERD10TJ122	1.2K	1	
R6109		ERD10TJ562	5.6K	1	
R6110		ERD10TJ223	22K	1	
R6111		ERD10TJ561	560	1	
R6112		ERD10TJ101	100	1	
R6114		ERD10TJ183	18K	1	
R6115		ERD10TJ332	3.3K	1	
R6116		ERD10TJ681	680	1	
R6117		ERD10TJ100	10	1	
R6120		ERD10TJ223	22K	1	
R6121		ERD10TJ154	150K	1	
R6129		ERD10TJ154	150K	1	
R6133		ERD10TJ103	10K	1	
R6134,6135		ERD10TJ153	15K	2	
R6137,6138		ERD10TJ153	15K	2	
R6147-6150		ERD10TJ104	100K	4	
R6151,6152		ERD10TJ102	1K	2	
R6204,6205		ERD10TJ682	6.8K	2	
R6206,6207		ERD10TJ682	6.8K	2	
R6208		ERD10TJ102	1K	1	
R6209		ERD10TJ333	33K	1	
R6210		ERD10TJ103	10K	1	
R6211		ERD10TJ102	1K	1	
R6212		ERD10TJ682	6.8K	1	
R6213,6214		ERD10TJ153	15K	2	
R6216		ERD10TJ123	12K	1	
R6217,6218		ERD10TJ102	1K	2	
R6219		ERD10TJ153	15K	1	
R6220		ERD10TJ333	33K	1	
R6221		ERD10TJ102	1K	1	
R6226		ERD10TJ562	5.6K	1	
R6222		ERD10TJ101	100	1	
R6223		ERD10TJ331	330	1	
R6224		ERD25TJ561	1/4W 560	1	
R6225		ERD10TJ273	27K	1	
R6228		ERD10TJ562	5.6K	1	
R6229		ERD10TJ152	1.5k	1	
R6126		ERD10TJ393	39K	1	
			Variable Resistors		
VR601		EVM38GA00B16	1M	1	
VR602		EVM38GA00B35	300K	1	
VR603		EVN38CA00B34	30K	1	
VR604		EVM38GA00B16	1M	1	
VR605		EVM38GA00B55	500K	1	
VR608-611		EVN38CA00B53	5K	4	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
VR612-615		EVN38CA00B14	10K	4	
VR616		EVN38CA00B12	100	1	
VR617		EVN38CA00B33	3K	1	
VR618		EVN38CA00B34	30K	1	
VR619		EVN38CA00B33	3K	1	
VR620		EVN38CA00B13	1K	1	
VR624-627		EVN38CA00B14	10K	4	
			Capacitors		
C601		ECEA2AS010	Electrolytic 100V 1	1	
C602		ECQM1H222MZ	Mylar 50V 0.0022	1	
C603		ECQV05154JZW	Mylar 50V 0.15	1	
C604		ECCR1H271J5	Ceramic 50V 270P	1	
C605		ECEA1AK330	Electrolytic 10V 33	1	
C606		ECEA1AK470	Electrolytic 10V 47	1	
C607		ECQM1H472MZ	Mylar 50V 0.0047	1	
C608		ECSF35E2R2	Tantalum 35V 2.2	1	
C609,610		ECEA1CK100	Electrolytic 16V 10	2	
C611		ECQM1H272MZ	Mylar 50V 0.0027	1	
C612		ECSF10E47	Tantalum 10V 47	1	
C613		ECQM1H472MZ	Mylar 50V 0.0047	1	
C614		ECQM1H102MZ	Mylar 50V 0.001	1	
C615		ECEA1CK100	Electrolytic 16V 10	1	
C616		ECQM1H103MZ	Mylar 50V 0.01	1	
C617		ECEA1ASS221	Electrolytic 10V 220	1	
C618		ECEA1AK470	Electrolytic 10V 47	1	
C619		ECQF6152KZ	Mylar 630V 0.0015	1	
C621		ECQE10472MV	Mylar 1kV 0.0047	1	
C622		ECEA450V1	Electrolytic 450V 1	1	
C623		ECQM4472MZ	Mylar 400V 0.0047	1	
C624-626		ECEA160V1	Electrolytic 160V 1	3	
C628		ECEA1HK100	Electrolytic 50V 10	1	
C629		ECQE4473MZ	Mylar 400V 0.047	1	
C630		ECEA1ASS101	Electrolytic 10V 100	1	
C631		ECEA2AS010	Electrolytic 100V 1	1	
C632		ECQM4472MZ	Mylar 400V 0.0047	1	
C634,635		ECEA1CN100S	Electrolytic 16V 10	2	
C636		ECQF6152KZ	Mylar 630V 0.0015	1	
C637		ECEA1AK470	Electrolytic 10V 47	1	
C638		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C639		ECQV05393JZ	Mylar 50V 0.039	1	
C640		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C641		ECCR1H391J5	Ceramic 50V 390P	1	
C642		ECQM1H102MZ	Mylar 50V 0.001	1	
C643		ECCR1H121J5	Ceramic 50V 120P	1	
C644		ECKR1H102KB5	Ceramic 50V 0.001	1	
C645		ECEA1ASS101	Electrolytic 10V 100	1	
C646		ECEA1AK470	Electrolytic 10V 47	1	
C647		ECSF10E47	Tantalum 10V 47	1	
C648		ECSF6E68	Tantalum 6.3V 68	1	
C649		ECQM1H472MZ	Mylar 50V 0.0047	1	
C650		ECCW1H561J5	Ceramic 50V 560P	1	
C651		ECCW1H181J	Ceramic 50V 180P	1	
C652,653		ECEA1HK010	Electrolytic 50V 1	2	
C654		ECQV05563JZ	Mylar 50V 0.056	1	
C655		ECCW1H561J5	Ceramic 50V 560P	1	
C658		ECEA1ASS221	Electrolytic 10V 220	1	
C660		ECEA1ESS470	Electrolytic 25V 47	1	
C661		ECCR1H221J5	Ceramic 50V 220P	1	
C662		ECEA1HK010	Electrolytic 50V 1	1	
C663		ECEA1HN010S	Electrolytic 50V 1	1	
C664		ECEA0JK330	Electrolytic 6.3V 33	1	
C665		ECEA1ASS221	Electrolytic 10V 220	1	
C666		ECEA1ASS101	Electrolytic 10V 100	1	
C667		ECQM1H472MZ	Mylar 50V 0.0047	1	
C668		ECEA1EK100	Electrolytic 25V 10	1	
C669		ECEA1ASS101	Electrolytic 10V 100	1	
C670		ECSF35E2R2	Tantalum 35V 2.2	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C672		ECEA1CK220	Electrolytic 16V 22	1	
C673		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C674		ECQS5331J	Mylar 500V 330	1	
C680		ECCR1H101J5	Ceramic 50V 100P	1	
C681		ECCR1H820J5	Ceramic 50V 82P	1	
C682		ECCW1H470J5	Ceramic 50V 47P	1	
C684		ECQV05104JZ	Mylar 50V 0.1	1	
C685		ECQM1H103MZ	Mylar 50V 0.01	1	
C686		ECQV05104JZ	Mylar 50V 0.1	1	
C687		ECKR1H102KB5	Ceramic 50V 0.001	1	
C688		ECCR1H101J5	Ceramic 50V 100P	1	
C689		ECCR1H221J5	Ceramic 50V 220P	1	
C690		ECCR1H821J5	Ceramic 50V 820P	1	
C6125		ECEA1EK220	Electrolytic 25V 22	1	
			Coils		
L601,602		VLQ7H101K	100µH	2	
L603,604		VLQ9H333J	33mH	2	
L605		EL0606SK-101K	100µH	1	
			Switch		
SW601		VSSW0014	Mode Selection SW	1	
		(ESD-14156)			
			Short Plug		
P601		EMCS0352M	3P	1	
P602		EMCS0652M	6P	1	
P603		EMCS0352M	3P	1	
P604		EMCS0652M	6P	1	
P608		EMCS0352M	3P	1	
P609		EMCS0252M	2P	1	
P610		EMCS0352M	3P	1	
P611		EMCS0251ML	2P	1	
P614		EMCS0252M	2P	1	
P615		EMCS0552M	5P	1	
P616		EMCS0451ML	4P	1	
P617-620		EMCS0252M	2P	4	
P622		EMCS0752M	7P	1	
P623		EMCS0251ML	2P	1	
P624		EMCS0452M	4P	1	
P626		EMCS0252M	2P	1	
P627		EMCS0252M	2P	1	
F601		XBA1C15NU100	Fuse	1	
T601		VEKW0265	F.B.T Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			A.W.C C.B.A.		
			IC		
IC701		AN6914		1	
			Transistors		
Q701		2SB641(Q,R)		1	
Q702		2SD636(Q,R)		1	
Q703		2SB641(Q,R)		1	
Q704		2SD636(Q,R)		1	
Q705		2SB641(Q,R)		1	
Q706		2SD636(Q,R)		1	
Q707		2SD636(Q,R)		1	
Q708		2SD636(Q,R)		1	
			Diodes		
D701		RD4.7E		1	
D702		MA165		1	
			Resistors		
R701		ERD10TJ562	5.6K	1	
R702		ERD10TJ561	560	1	
R703		ERD10TJ152	1.5K	1	
R704		ERD10TJ332	3.3K	1	
R705		ERD10TJ272	2.7K	1	
R706		ERD10TJ103	10K	1	
R707		ERD10TJ153	15K	1	
R708		ERD10TJ682	6.8K	1	
R709		ERD10TJ562	5.6K	1	
R710		ERD10TJ102	1K	1	
R711		ERD10TJ102	1K	1	
R712		ERD10TJ332	3.3K	1	
R713		ERD10TJ272	2.7K	1	
R714		ERD10TJ332	3.3K	1	
R715		ERD10TJ332	3.3K	1	
R717		ERD10TJ222	2.2K	1	
R718		ERD10TJ222	2.2K	1	
R719		ERD10TJ104	100K	1	
R720		ERD10TJ104	100K	1	
R721		ERD10TJ472	4.7K	1	
R722		ERD10TJ472	4.7K	1	
			Variable Resistors		
VR701		EVN30CA00B33	3K	1	
VR702		EVN30CA00B33	3K	1	
			Capacitors		
C701		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C702		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C703		ECEA1HKNR47	Electrolytic 50V 0.47	1	
C704		ECEA1HKNR47	Electrolytic 50V 0.47	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C705		ECEA1AK470	Electrolytic 10V 47	1	
C706		ECQV05104JZ	Mylar 50V 0.1	1	
C707		ECEA1AK470	Electrolytic 10V 47	1	
C708		ECQV05104JZ	Mylar 50V 0.1	1	
C709		ECKR1H103ZF5	Ceramic 50V 0.01	1	
C710		ECKR1H103ZF5	Ceramic 50V 0.01	1	
		VEKW0214	2P Connector Ass'y	1	
		VEKW0215	2P Connector Ass'y	1	
		VEKW0228	6P Connector Ass'y	1	
			A.L.C C.B.A.		
			Integrated Circuit		
IC501		AN6552		1	
			Transistor		
Q501		2SD636(Q,R)		1	
Q502		2SB641(Q,R)		1	
Q503		2SD636(Q,R)		1	
			Diode		
D501		MA26W		1	
			Resistors		
R501		ERD10TJ562	5.6K	1	
R502		ERD10TJ272	2.7K	1	
R503		ERD10TJ683	68K	1	
R504		ERD10TJ562	5.6K	1	
R505		ERD10TJ153	15K	1	
R506		ERD10TJ153	15K	1	
R507		ERD10TJ101	100	1	
R508		ERD10TJ152	1.5K	1	
R509		ERD10TJ154	150K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R510		ERD10TJ152	1.5K	1	
R511		ERD10TJ152	1.5K	1	
R512		ERD10TJ471	470	1	
R513		ERD10TJ562	5.6K	1	
R514		ERD10TJ223	22K	1	
R515		ERD10TJ822	8.2K	1	
R516		ERD10TJ332	3.3K	1	
R517		ERD10TJ152	1.5K	1	
			Variable Resistors		
VR501		EVN-30CA00B53	5K	1	
VR502		EVN-30CA00B53	5K	1	
VR503		VSSW0007	2.2K	1	
			Capacitor		
C501		ECEA16N10U	Electrolytic 16V 10	1	
P501		EMCS0452M	4P Short Plug	1	
P502		EMCS0452M	4P Short Plug	1	
		VEKW0177	7P Connector Ass'y	1	
			FADER C.B.A.		
			Transistors		
Q401		2SB641(R)		1	
Q402,403		2SD636(R)		2	
Q404-406		2SB641(R)		3	
Q407		2SD636(R)		1	
Q410-413		2SD636(R)		4	
Q414		2SD636(Q,R)		1	
Q415,416		2SB641(Q,R)		2	
			Diodes		
D401,402		MA165		2	
D404-410		MA165		7	
D411		RD6.2E		1	
D412		MA165		1	
D413		0A90		1	
D414		MA165		1	
			Resistors		
R401		ERD10TJ333	33K	1	
R402		ERD10TJ101	100	1	
R403		ERD10TJ471	470	1	
R404		ERD10TJ392	3.9K	1	
R405		ERD10TJ103	10K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R407		ERD10TJ103	10K	1	
R409		ERD10TJ683	68K	1	
R410		ERD10TJ103	10K	1	
R411		ERD10TJ472	4.7K	1	
R412		ERD10TJ273	27K	1	
R413		ERD10TJ183	18K	1	
R414		ERD10TJ684	680K	1	
R415		ERD10TJ273	27K	1	
R418		ERD10TJ472	4.7K	1	
R419		ERD10TJ103	10K	1	
R420		ERD10TJ392	3.9K	1	
R421		ERD10TJ153	15K	1	
R423		ERD10TJ391	390	1	
R424		ERD10TJ273	27K	1	
R426		ERD10TJ103	10K	1	
R427		ERD10TJ392	3.9K	1	
R429		ERD10TJ153	15K	1	
R430		ERD10TJ273	27K	1	
R431,432		ERD10TJ223	22K	2	
R433		ERD10TJ104	100K	1	
R434		ERD10TJ123	12K	1	
R435		ERD10TJ822	8.2K	1	
			Capacitors		
C402		ECEA1HK010	Electrolytic 50V 1	1	
C403		ECEA1CK100	Electrolytic 16V 10	1	
C404		ECEA1ASS101	Electrolytic 10V 100	1	
C405		ECEA1AK330	Electrolytic 10V 33	1	
C406		ECEA1ASS101	Electrolytic 10V 100	1	
C407		ECEA1AK330	Electrolytic 10V 33	1	
C409		ECEA1HKR47	Electrolytic 50V 0.47	1	
C410		ECEA1CK100	Electrolytic 16V 10	1	
C411		ECEA1ASS221	Electrolytic 10V 220	1	
C412		ECEA1CK100	Electrolytic 16V 10	1	
C413		ECEA1HKR47	Electrolytic 50V 0.47	1	
			Short Plug		
P401		EMCS0252M	2P	1	
P402		EMCS0452M	4P	1	
P404		EMCS0352M	3P	1	
		VEKW0208	2P Connector Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			REAR SIDE C.B.A.		
			Variable Resistor		
VR801		EVJ3LA309B24	20K	1	
SW801-803		VSSW0015	Sensitibity SW (801)	3	
			Fade SW (802)		
			Stand-by SW (803)		
			Connectors		
		VEKW0220	3P Connector Ass'y	1	
		VEKW0221	3P Connector Ass'y	1	
		VEKW0223	4P Connector Ass'y	1	
		VEKW0213	2P Connector Ass'y	1	
			A.W.C. SW C.B.A.		
		VSSW0010	AWC SW	1	
		VEKW0212	2P Connector Ass'y	1	
			REMO. CON. SW C.B.A.		
		ESB-6223	Remote Control Switch	1	
		VEKW0205	2P Connector Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			EVF H. C.B.A.		
			Transistors		
Q906		2SB642(Q,R)		1	
Q907		2SD636(Q,R)		1	
Q908		2SC1567(Q,R)		1	
Q9100		2SD636(Q,R)		1	
Q9101		2SD636(Q,R)		1	
Q9102		2SD636(Q,R)		1	
			Diodes		
D903-906		MA165		4	
D907		S1B01-01		1	
D908		RA-1SF or ES-1F		1	
D909		S1B01-01		1	
D811		BR5704S	Tally Led	1	
			Resistors		
R933		ERD10TJ272	2.7K	1	
R934		ERD10TJ563	56K	1	
R935		ERD10TJ183	18K	1	
R936		ERD10TJ391	390	1	
R937		ERD10TJ222	2.2K	1	
R938		ERD10TJ272	2.7K	1	
R939		ERD10TJ393	39K	1	
R940		ERD10TJ270	27	1	
R941		ERD10TJ331	330	1	
R942		ERD10TJ102	1K	1	
R943		ERD10TJ102	1K	1	
R945		ERD10TJ152	1.5K	1	
R946		ERD25VJ101	1/4W 100	1	
R948		ERD25TJ475	1/4W 4.7M	1	
R949		ERD25TJ275	1/4W 2.7M	1	
R952		ERD10TJ105	1M	1	
R953		ERD10TJ330	33	1	
R954		ERD10TJ334	330K	1	
R9100		ERD10TJ471	470	1	
R9101		ERD10TJ102	1K	1	
R9102		ERD10TJ823	82K	1	
R9103		ERD10TJ823	82K	1	
R9104		ERD10TJ102	1K	1	
R9105		ERD10TJ562	5.6K	1	
			Variable Resistors		
VR901		EVTV2C10KB13	1K	1	
VR903		CR-19R2.2MB or	2.2M	1	
		EVMH1GA00B26			
VR904		EVTV2C10KB55	500K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Capacitors		
C920		ECQV05103JZ	Mylar 50V 0.01	1	
C921		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C922		ECQV05223JZ	Mylar 50V 0.022	1	
C923		ECQV05154JZ	Mylar 50V 0.15	1	
C924		ECEA1CK100	Electrolytic 16V 10	1	
C925		VCAMS100V472J	Mylar 100V 0.0047	1	
C926		ECEA1CS471S	Electrolytic 16V 470	1	
C928		ECQE1104KN	Mylar 100V 0.1	1	
C929		ECKD3A392KB2	Ceramic 1kV 0.0039	1	
C930		VCMK0007	Mylar 200V 0.1	1	
C931		ECKD3A152KB2	Ceramic 1kV 0.0015	1	
C933		ECQV05683JZ	Mylar 50V 0.068	1	
C934		ECEA1JS100	Electrolytic 63V 10	1	
C9100		ECEA1CK100	Electrolytic 16V 10	1	
C9101,9102		ECEA1HK010	Electrolytic 50V 1	2	
			Coils		
L903		VLQ7H101K	100μH	1	
L904		VLQ9H391K	390μH	1	
L905		TLH-6307-1		1	
SW902		VSSW0012	REMO.CON.SW	1	
P902		EMCS0752M	7P Short Plug	1	
T901		ETF18L12A	FBT	1	
		VEKW0240	CRT Socket Ass'y	1	
		VEKW0235	5P Connector Ass'y	1	
		VMGW0025	Diode Holder	1	
		40JB4	CRT		
		ELY15V106A	DY		

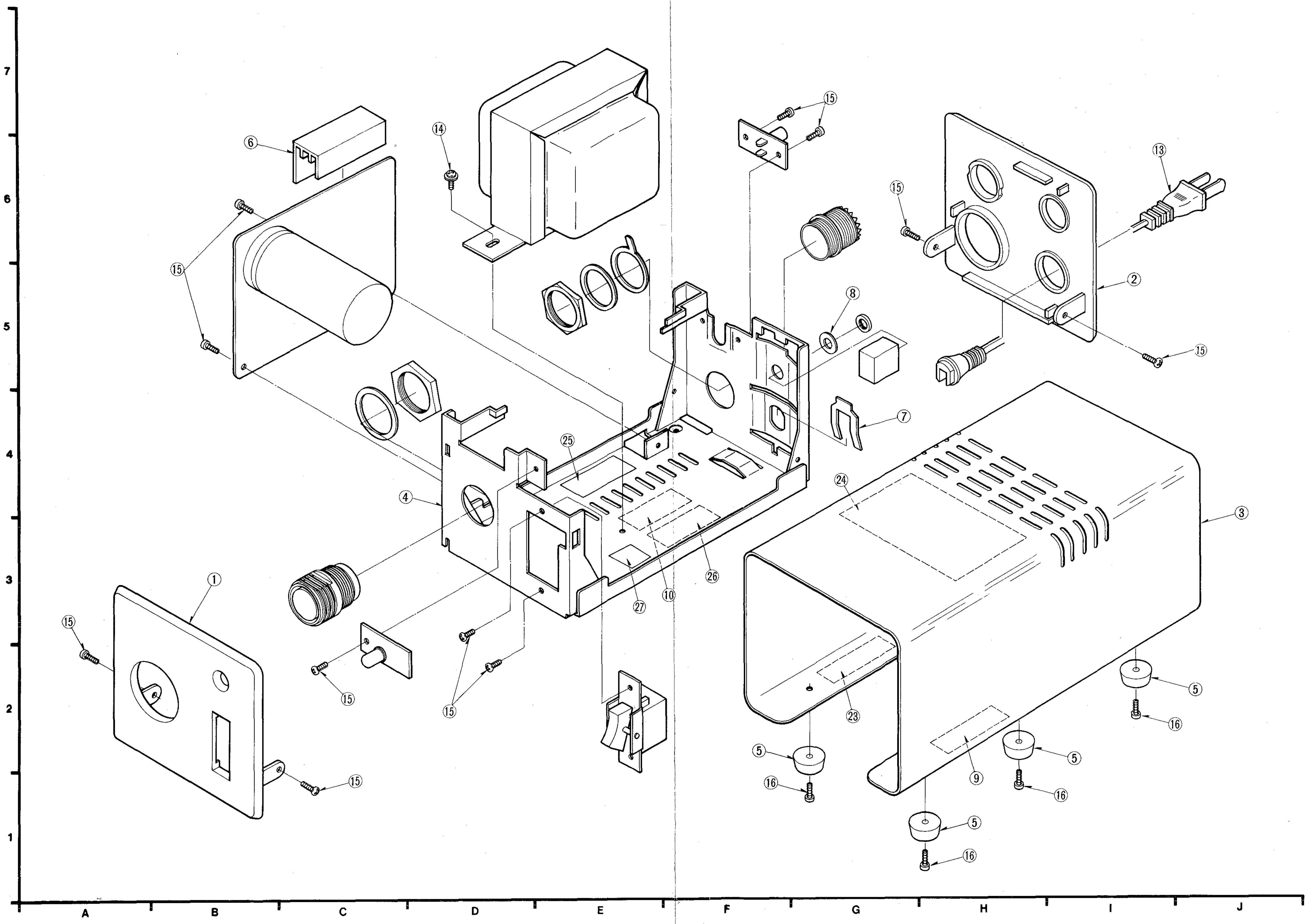
Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			EVF V. C.B.A.		
			Integrated Circuit		
IC901		AN374P		1	
			Transistors		
Q801		2SD973(Q,R)		1	
Q901		2SD636(R,S)		1	
Q902		2SD662(Q,R)		1	
Q903		2SB642(Q,R)		1	
Q904		2SD637(R,S)		1	
Q905		3SF11(Q)		1	
			Diode		
D901-902		MA165		2	
			Resistors		
R801		ERD10TJ152	1.5K	1	
R802		ERD10TJ331	330	1	
R803		ERD10TJ222	2.2K	1	
R804		ERD10TJ222	2.2K	1	
R805		ERD10TJ100	10	1	
R806		ERD10TJ470	47	1	
R901		ERD10TJ683	68K	1	
R902		ERD10TJ153	15K	1	
R903		ERD10TJ222	2.2K	1	
R904		ERD10TJ391	390	1	
R905		ERD10TJ561	560	1	
R906		ERD10TJ333	33K	1	
R907		ERD10TJ562	5.6K	1	
R908		ERD10TJ102	1K	1	
R909		ERD10TJ183	18K	1	
R911		ERD10TJ151	150	1	
R912		ERD10TJ334	330K	1	
R913		ERD10TJ391	390	1	
R915		ERD10TJ153	15K	1	
R916		ERD10TJ332	3.3K	1	
R917		ERD10TJ223	22K	1	
R918		ERD10TJ472	4.7K	1	
R919		ERD10TJ683	68K	1	
R920		ERD10TJ101	100	1	
R921		ERD10TJ102	1K	1	
R922		ERD10TJ334	330K	1	
R923		ERD10TJ334	330K	1	
R924		ERD10TJ562	5.6K	1	
R925		ERD10TJ223	22K	1	
R926		ERD10TJ333	33K	1	
R927		ERD10TJ153	15K	1	
R928		ERD10TJ822	8.2K	1	
R929		ERD10TJ103	10K	1	
R930		ERD10TJ223	22K	1	
R931		ERD10TJ2R7	2.7	1	
R932		ERD10TJ102	1K	1	
R950		ERD10TJ152	1.5K	1	
R951		ERD10TJ105	1M	1	
R9106		ERD10TJ102	1K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Variable Resistors		
VR902		EVN-38CA00B52	500	1	
			Capacitors		
C801		ECKR1H103ZF	Ceramic 50V 0.01	1	
C802		ECEA1AK470	Electrolytic 10V 47	1	
C803		ECQV05104JZ	Mylar 50V 0.1	1	
C901		ECEA1AS101	Electrolytic 10V 100	1	
C902		ECEA1CN100S	Electrolytic 16V 10	1	
C903		ECCF1H271J	Ceramic 50V 270P	1	
C905		ECEA1AK470	Electrolytic 10V 47	1	
C906		ECCR1H331J	Ceramic 50V 330P	1	
C907		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C908		ECQV05103JZ	Mylar 50V 0.01	1	
C909		ECEA1HNR47S	Electrolytic 50V 0.47	1	
C910		ECEA1CK330	Electrolytic 16V 33	1	
C911		ECCR1H100D5	Ceramic 50V 10P	1	
C912		ECEA1JS220	Electrolytic 63V 22	1	
C913		ECEA1CS471S	Electrolytic 16V 470	1	
C914		ECSF10E2R2	Tantalum 10V 2.2	1	
C915		ECSF10E10	Tantalum 10V 10	1	
C916		ECQV05103JZ	Mylar 50V 0.01	1	
C917		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C918		ECEA0JS102S	Electrolytic 6.3V 1000	1	
C919		VCAMS50V272J	Mylar 50V 0.0027	1	
C932		ECQE2104KS	Mylar 250V 0.1	1	
SW901		VSSW0011	R.L. Selection SW.	1	
			Coil		
L902		KLH-5A	Lineality Coil	1	
P901		EMCS0452M	4P Short Plug	1	
		VEKW0237	7P Connector Ass'y	1	
		VEKW0239	7P Connector Ass'y	1	
			EVF LED. C.B.A.		
D910		LN43SYP		1	
D911		LN33SGP(H)	Diode	1	
D912		SG207D	Diode	1	
		VXFW0006	Diode Holder	1	
		VEKW0254	Ground Spring Ass'y	1	
		VEKW0236	5P Connector Ass'y	1	
			SPECIAL TUBE SOCKET C.B.A.		
		VJSK1116	Socket	1	
C693		ECKX2H102ZE	Ceramic 50V 1000P	1	
		VEKW0266	2P Connector Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			ZOOM SW. C.B.A.		
		VEKW0238	7P Connector Ass'y	1	
			BIAS LIGHT C.B.A.		
D620-625		PG2222SK	Bias Light	6	
		VEKW0219	3P Connector Ass'y	1	
		VEKW0204	Camera Cable Ass'y	1	
		VEKW0231	EXT.Mic. Ass'y	1	
		VEKW0230	Power Transistor Ass'y	1	
		VEKW0232	8P Socket Ass'y	1	
		VEKW0233	10P Socket Ass'y	1	
		VEKW0258	EXT. REMO. CON Socket		
			Ass'y	1	
		ELY-18A212B	DY Ass'y		
		or VEKW0273			
		K9373	Special Tube	1	
		TJC6320	Fuse Holder	2	
		VEKW0260	Moter Ass'y	1	
		VEKW0264	Condenser Ass'y	1	
		VEKW0234	10P Cable Ass'y	1	

MEMO

❶ *Power Supply Unit Section (optional accessory)*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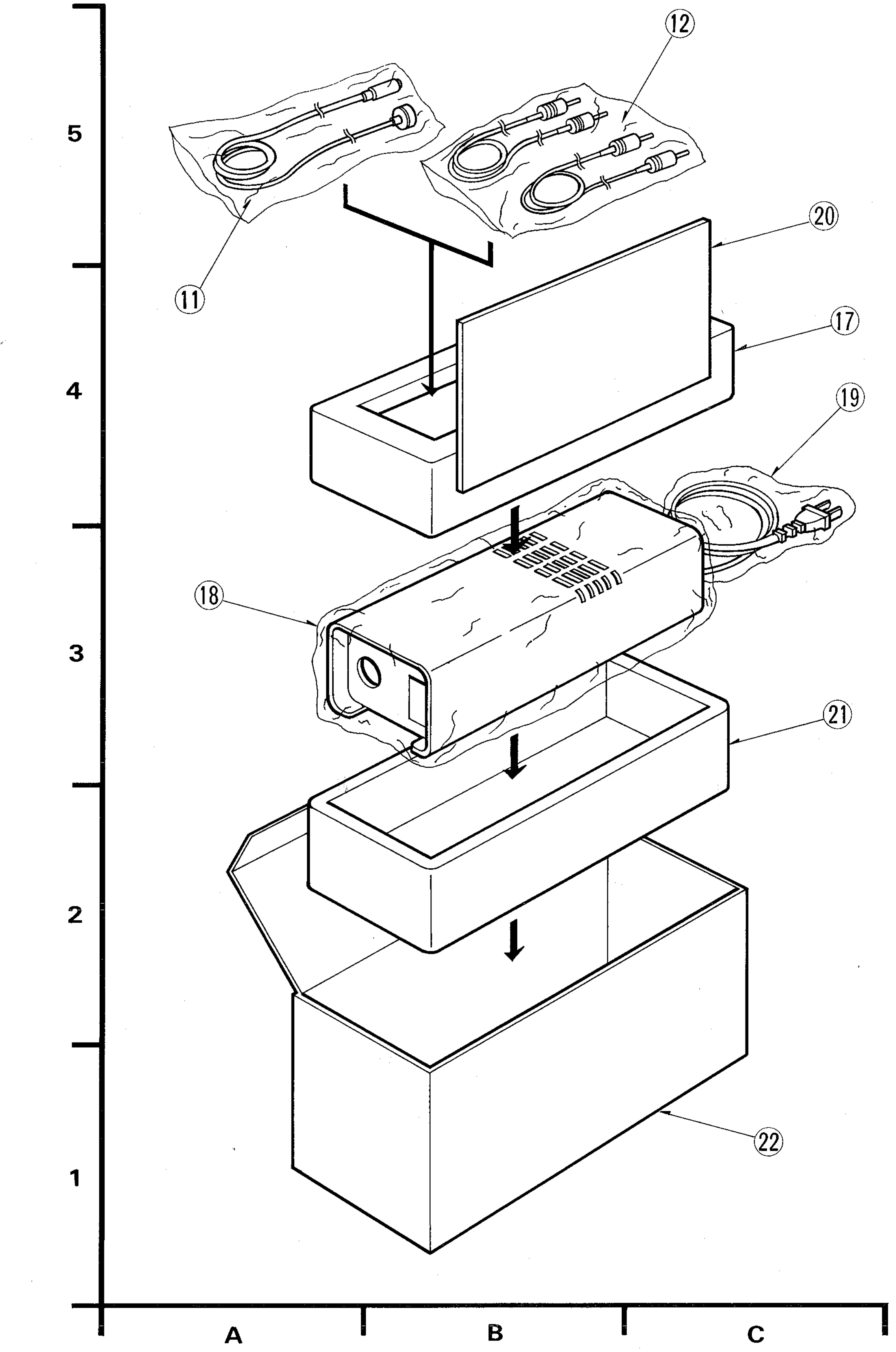
❷ *Packing Parts Section*



MECHANICAL REPLACEMENT PARTS LIST

Note: *Be sure to make your orders of replacement parts according to this list.
○ . . . . Available replacement part
X . . . . Not available as replacement
☐ . . . . Only available on special order

Item No.	Drawing No.	Description	Pcs/ Set	Availa-bility	Part No.	Remark
		PSU				
1		PSU FRONT COVER	1	o	VKGW0176	
2		BACK COVER	1	o	VKGW0006	
3		TOP COVER	1	o	VKGW0177	
4		MAIN CHASSIS	1	o	VMKW0001	
5		RUBBER LUG	4	o	VKAW0001	
6		FUSE COVER	1	o	VJFW0001	
7		AC CORD PLATE	1	o	VMAW0018	
8		WASHER	1	o	VMKW0006	
		LABEL				
9		PSU CAUTION LABEL	1	o	VQLW0196	
10		PSU LABEL	1	o	VQLW0222	
		CABLE				
11		VIDEO CABLE ASS'Y	1	o	VFAK0006	
12		AUDIO REMO.CON. CABLE ASS'Y	1	o	VFAK0005	
13		AC CORD	1	o	VJAW0004	
		SCREW				
14		PAN HEAD SCREW WITH SPRING	1	o	XYN4+F6FU	
		PLATE 3φ x 8 mm				
15		BIND TAPPING SCREW	11	o	XTB3+6FFU	
		3φ x 6 mm				
16		BIND SCREW 3φ x 8 mm	4	o	XSB3+8FZ	
		PACKING				
17		CUSHION TOP	1	o	VPGW0006	
18		POLY BAG FOR PSU	1	o	XZB17X27A02	
19		POLY BAG FOR PSU CORD	2	o	XZB10X22A05	
20		FAN BAG KIT	1	o	VQTW0043	
21		CUSHION BOTTOM	1	o	VPGW0007	
22		PSU PACKING CASE	1	o	VPKW0142	
		LABEL				
23		ATTENTION LABEL	1	o	VQLW0001	
24		SERVICEMAN W LABEL	1	o	VQLW0005	
25		FUSE LABEL (CAUTION)	1	o	VQLW0004	
26		FUSE LABEL (ATTENTION)	1	o	VQLW0003	
27		PSU CHASSIS LABEL	1	o	VQLW0074	

ELECTRICAL REPLACEMENT PARTS LIST

Note:
1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified by shade have special characteristics important for safety. When replacing any of these components, use only the original ones.
3. Unless otherwise specified;
All resistors are in OHMS (Ω), 1/4w, ±5% carbon, K = 1,000 Ω, M = 1,000 KΩ.
All capacitors are in MICROFARADS (μF), ±10%, P = μμF.
All coils are in MICROHENRIES (μH), m = 10³
4. C.B.A: Circuit Board Assembly.
5. C.B: Circuit Board.

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Power Supply C.B.A.		
			Capacitors		
C101-104		ECKW2H103PE8	500V 0.01	4	
C105		ECET25R103SW	25V 10000	1	
			Diode		
D101		MI-152		1	
D102		MI-152R		1	
D103		LN21RP-TV		1	
		or LN21RPH-TV			
			Resistor		
R101		ERD12TJ561	1/2W 560	1	
F101		XBA1F08NU14A	Fuse	1	
		VSKW0022	Power SW	1	
		VJJK0037	REMO.CON.Socket	1	
		VEKW0157	10 Pin Connector	1	
		ETP57EU23B	Power Transformer	1	
		TJC6319	Fuse Holder	2	